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Training Aide: Research and Guidance for Effective Training User Guide

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United States Army Research Institute for the Behavioral and Social Sciences

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14. ABSTRACT: This is a user guide for the web-based tool called Training Aide: Research and Guidance for Effective Training (TARGET). TARGET is a database of training effectiveness research findings that provides information on the relationships between training methods and performance. TARGET provides query-based searches of the training literature database, numerous visualizations of the relationships between training methods and performance, and it is updateable as additional training research is generated so that the tool stays current with state-of-the-art training research developments. It was designed to assist users in better understanding the relative effectiveness of different training methods for acquiring/transferring cognitive skills. The database includes six primary types of training methods (i.e., part task training, task difficulty sequencing, error prevention, scaffolding, learner control, and exploratory learning), as well as factors that moderate their effectiveness, such as skill type being trained, trainee characteristics (e.g., experience level), and type of training performance outcome (e.g., procedural knowledge, transfer). ARI Technical Report 1333 and ARI Research Note 2014-01 accompany this user guide.

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Training Aide: Research and Guidance for Effective Training User Guide

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TRAINING AIDE: RESEARCH AND GUIDANCE FOR EFFECTIVE TRAINING
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TRAINING AIDE: RESEARCH AND GUIDANCE FOR EFFECTIVE TRAINING USER GUIDE

Introduction to TARGET

What is TARGET?

TARGET stands for Training Aide: Research and Guidance for Effective Training (TARGET). TARGET is a database of training effectiveness research findings that provides information on the relationships between training methods and performance. The training tool is comprised of a database of training effectiveness research findings and a graphical user interface (GUI). TARGET provides query-based searches of the training literature database, numerous visualizations of the relationships between training methods and performance, and it is updateable as additional training research is generated so that the tool stays current with state-of-the-art training research developments. It was designed to assist users in better understanding the relative effectiveness of different training methods for acquiring/transferring cognitive skills involved in complex Army-relevant task domains. The database includes six primary types of training methods (i.e., part task training, task difficulty sequencing, error prevention, scaffolding, learner control, and exploratory learning), as well as factors that moderate their effectiveness, such as skill type being trained, trainee characteristics (e.g., experience level), and type of training performance outcome (e.g., procedural knowledge, transfer). In sum, TARGET is designed to assist users in identifying appropriate training methods (via underlying computational algorithms) for different combinations of tasks/skills being trained (or types of trainees that would participate in the intended training) and the performance outcomes sought.

Who are the Intended Users of TARGET?

TARGET is geared towards any user interested in the relationships between training methods and performance; however, two user types were directly considered in the development of TARGET.

- Training Developers – Training professionals (e.g., instructional system designers) involved in the design and development of training programs.
- Training Researchers – Researchers involved in studying training effectiveness.

How to Think about TARGET?

TARGET use may be framed by the following general question:
Given a certain task to be trained, a set of trainees, and training goals – what training media and methods are likely to be most effective?

What is the Purpose of this User Guide?

This user guide is intended to provide the user with a comprehensive guide for understanding and utilizing TARGET. It contains both written guidelines and associated images.

Gaining Access to TARGET

Who Can Access TARGET?

TARGET is a web based tool; the website is publicly accessible at http://bldr-webtest.alionscience.com/Target/ (Figure 1). Anyone with a username and password can access TARGET. Users simply to define their username and password and provide a valid email address for registration.

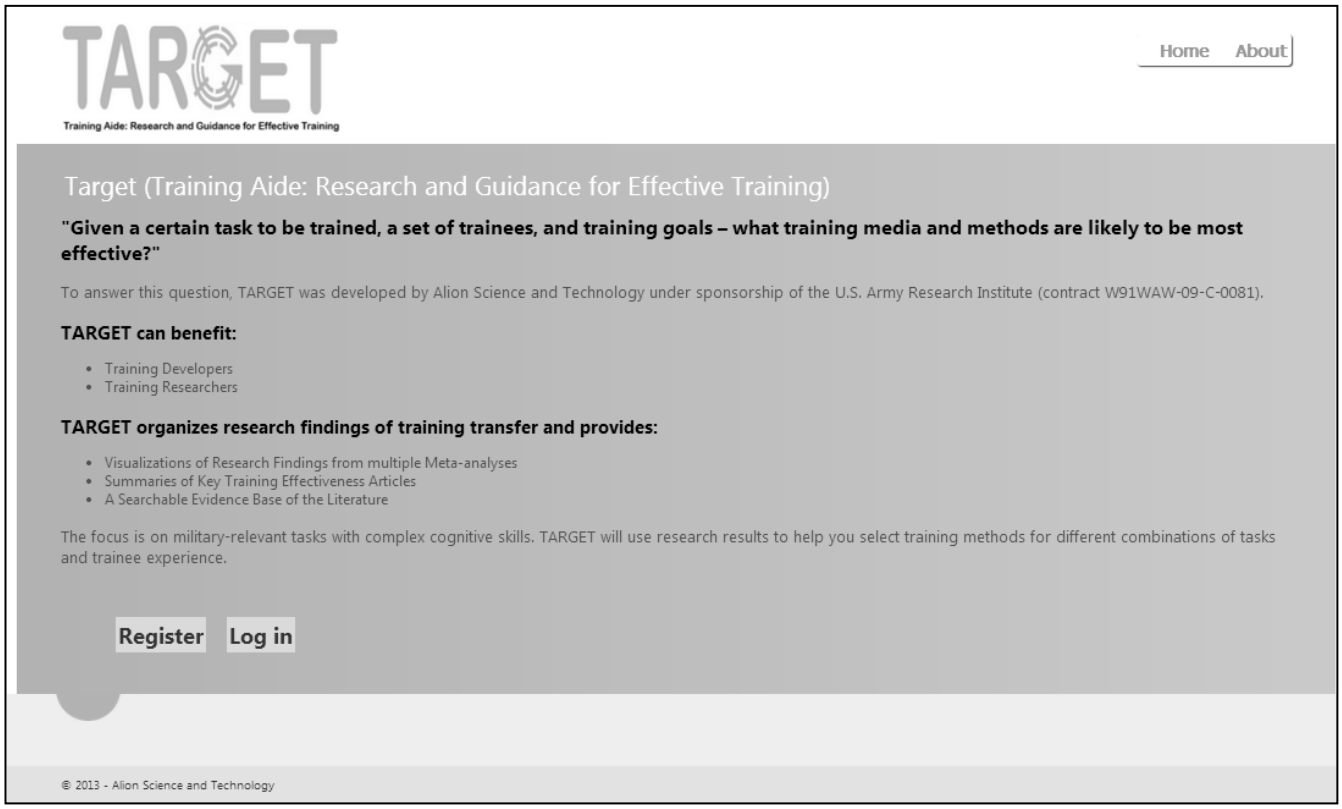


Figure 1. TARGET Log-In Page

Registering as a User in TARGET

The *register* function is how you may register yourself as a user. Registration allows you to create a username and password and obtain access to the tool. From the log in page of TARGET:

1) Select "Register" on the log-in page (Figure 1)
2) Enter a user name and password (Figure 2)
3) Confirm the password
4) Enter a valid email address (Figure 2)
5) Click on the Register button (Figure 2)

Figure 2. Register Page

The only requirements for registration are that (1) the selected username is unique (i.e., does not already exist for another TARGET user), and (2) you provide a valid email address.

Users are categorized as Administrator or Contributor. By default all new users are contributors, meaning that they can add new documents, search, edit/delete documents they created, and visualize training effectiveness results. Administrators can delete/modify any documents and can change user categories.

How to Get More Information About TARGET and Access to TARGET?

Additional information about TARGET, as well as contact information for the TARGET administrator are available under the "About" link in the tab menu at the top of the window. From the log in page of TARGET, the user may get additional information by selecting *about*. The *about* function allows users (whether registered or not) to read summary information about the tool. Also available under the "About" link is contact information. You can contact either the TARGET program manager or the U.S. ARI sponsor directly through the provided phone number or email address listed on the homepage of TARGET.

Logging Into TARGET

TARGET uses a straightforward sign in process. Logging in requires you to enter your username and password, and then selecting "*Log in.*" Upon signing in you are taken to the home page of TARGET.

Changing Your Password

To change your password, click on your username at the top of any page preceded by the text "Hello,". TARGET will open the Change Password page. Enter your current password, a new password and the new password again for confirmation. Click the "Change Password" button. TARGET will display a message at the top of the window that your password has been changed.

Figure 3. Change Password

General Navigation of TARGET

Home Page

The Home page is the top level page of TARGET for any user logged into the tool (Figure 4). All other interfaces in TARGET link back to the home page. The primary navigation options available on the left side of the home page are also available as links at the top of the window.

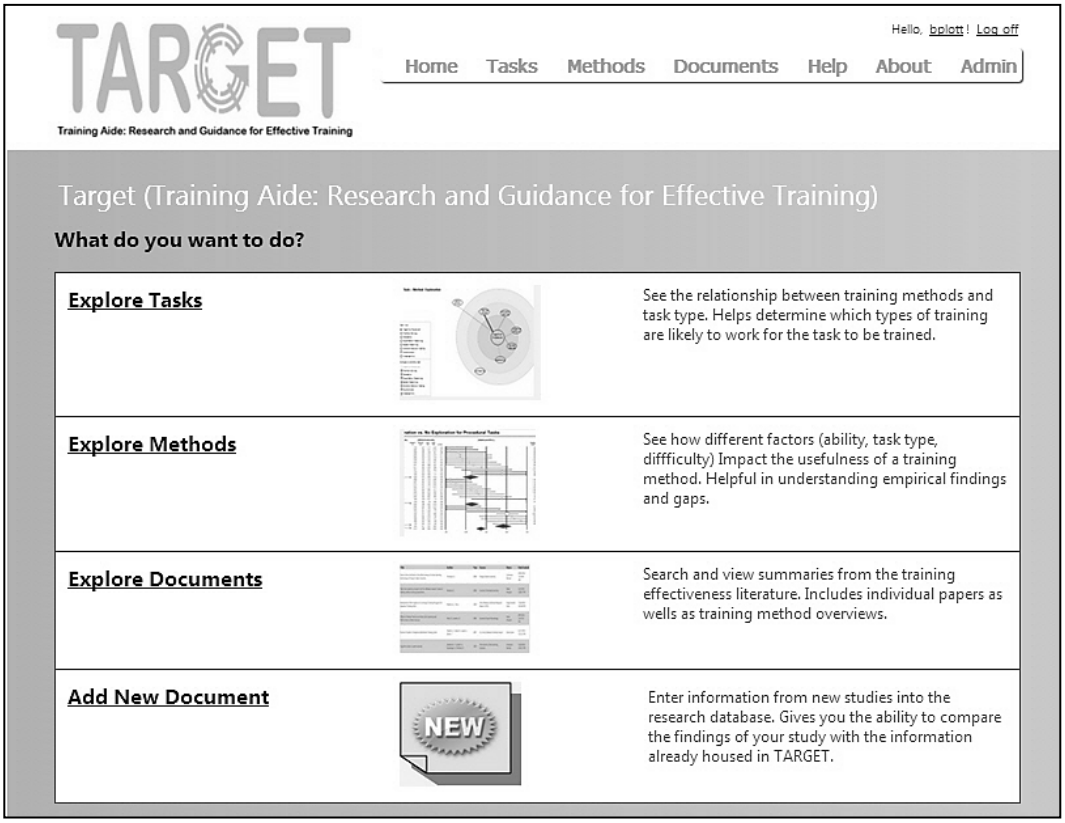


Figure 4. TARGET Home Page

Menu Navigation

Menu navigation links are always present at the top of the window (Figure 5). The menu navigation is provided by a fixed set of options., These include: **Home, Tasks, Methods, Documents, Help, About, Admin** and **Log off** (Note: Admin is available to Administrators only). These navigation options allow you to quickly jump between the main components of TARGET.

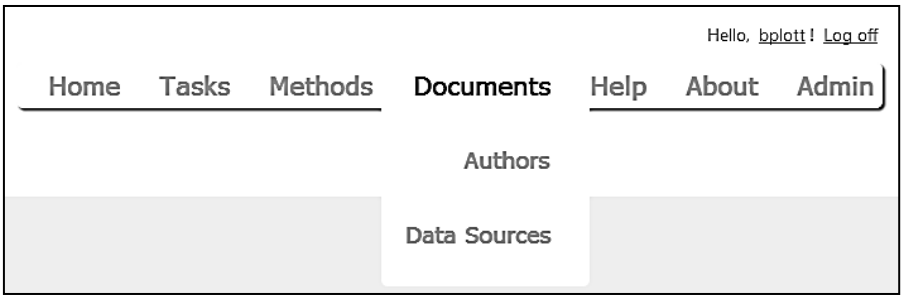


Figure 5. Top Menu

If you hover the mouse over Documents, Help, or the Admin menu item additional options are displayed. Under *Document*, Authors and Data Sources are displayed as sub-menus (Figure 5). Under *Help* you can select Definitions and under *Admin* you can optionally select Categories, Attributes, or Document Summary MetaData.

Home

Choose this option if you wish to return to the top level home page of TARGET.

Documents

Choose this option if you wish to link to the "Explore Documents" component of TARGET. You can also select the "Authors" submenu to view the list of authors in the database, add new authors, and view documents (e.g., a research study) associated with any author. Selecting the "Data Sources" submenu allows you to view the list of data sources in the database and add new sources.

Methods

Choose this option if you wish to link to the "Explore Methods" component of TARGET.

Tasks

Choose this option if you wish to link to the "Explore Tasks" component of TARGET.

Help

Choose this option if you wish to access the online help. The help menu provides you with access to an indexed help menu. Help topics may be browsed by the explorer tree or by searching on keywords. You can also select the "Definitions" submenu to view detailed definitions of selected training methods.

About

The "About" option provides background information on TARGET and provides contact information.

Log off

Choose this option if you wish to sign out of the system. Logging out returns you to the log in screen.

Admin

The Admin menu option is only visible to users with Administrator privileges. The Admin menu offers three submenu choices: Categories, Attributes, or Document Summary MetaData. The "Categories" option allows you to view/edit the categories that are displayed on the Document attributes page. The "Attributes" option lets you view/edit the attributes that are displayed under each category on the Document attributes page. The "Document Summary MetaData" option allows you to view/edit the document fields and field definitions.

Drop-Down Menus

Drop-down menus are used frequently throughout the tool. By clicking the down arrow on the right side of the menu, a number of options are made available. Options presented in a drop-down menu are mutually exclusive - only one item may be selected at a time.

To make a drop-down menu selection, position the cursor over the down arrow on the right side of the menu, move the cursor over the desired option in the drop-down menu to highlight your choice, and then left click the mouse to make your selection (Figure 6).

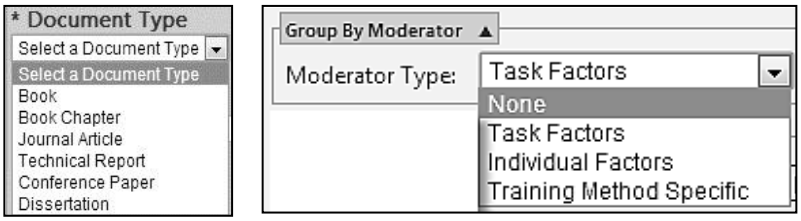


Figure 6. Example Drop-Down Menus

Radio Buttons

Radio button menus are available throughout the tool. They allow you to make a single selection among a range of choices. The options available in a radio button menu are mutually exclusive options; therefore, only one item may be selected at a time.

To make a radio button menu selection within a menu set, position the cursor over the empty radio button to the left of the desired item and left click the mouse to make your selection. The radio button to the left of the selected item will be filled in with a dot to indicate selection (Figure 7). Radio buttons have a small "i" icon next to the label that provide short definitions of the associated option. Hover your mouse over the "i" to see the definition.

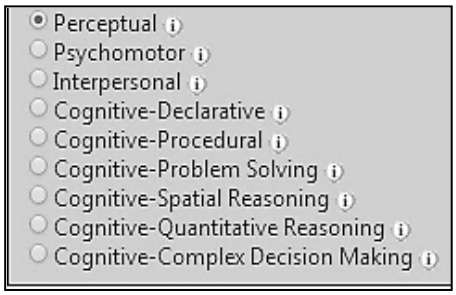


Figure 7. Radio Button Example

Check Boxes

Check box menus allow you to make a number of selections among a range of choices. Unlike radio button or drop-down menus, check box menus are not mutually exclusive; multiple items may be selected at one time.

To make a check box menu selection within a menu set, position the cursor over the empty check box to the left of the desired item and left click the mouse to make your selection. The check box to the left of the selected item will be filled with a check mark to indicate selection (Figure 8).

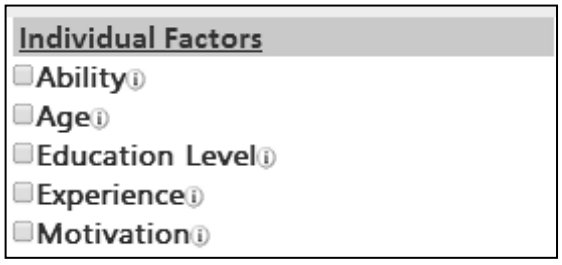


Figure 8. Checkbox Example

Free Text Fields

A number of free text fields are available in TARGET. The free text fields allow you to type information. For example, the *Document Title* field under Create New document allows you to type the document title in the text field. (Figure 9).

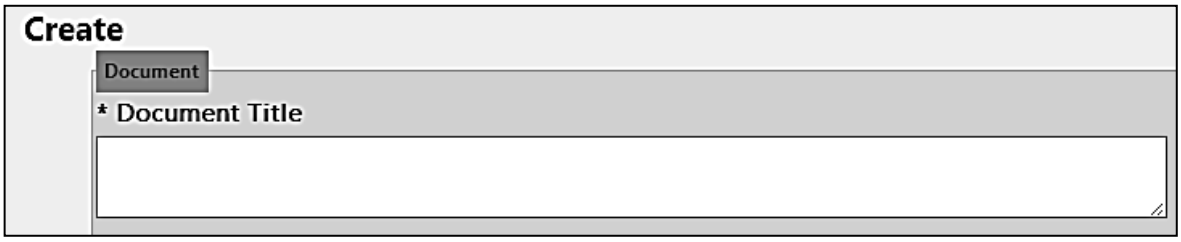


Figure 9. Free Text Field Example

Left/Right Mouse Navigation

Throughout TARGET, you can navigate the tool by utilizing left or right mouse clicks. Left mouse clicks are used to make selections (e.g., radio buttons, check boxes, and navigation links). Right mouse clicks are used to reveal embedded options. For example, right mouse clicks will open the hidden options when interacting with visualizations.

Embedded Links Between Components of TARGET

Throughout TARGET, each component (i.e., Explore Tasks, Explore Methods, Explore Documents, and Add New Document), as well as a number of additional features is set up to allow cross linkages between components in complementary ways. For example, within the Explore Methods component of TARGET, the forest plot allows users to interactively connect to the document summary for any individual research study displayed in the forest plot.

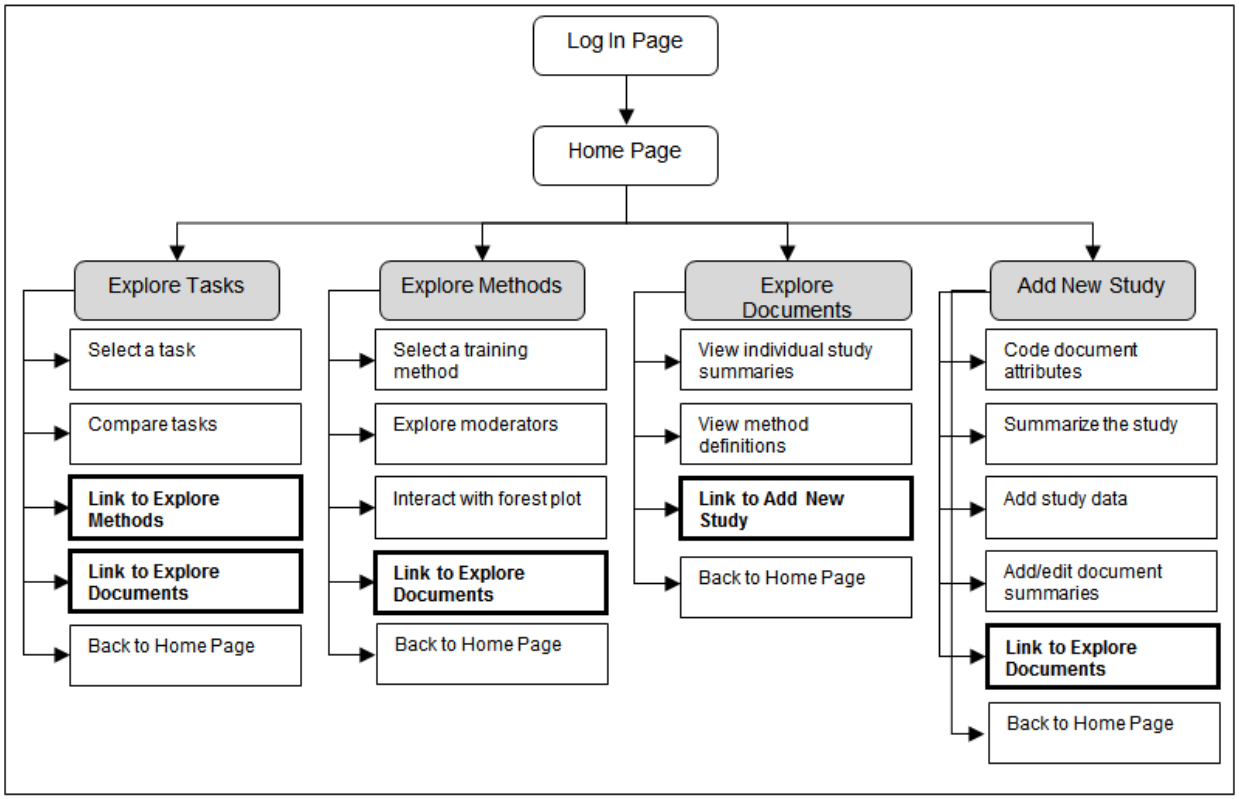


Figure 1. TARGET High Level Overview with Links Highlighted

The following is a complete list of all embedded cross-component links available in TARGET:

- Add New Document links to Search Literature once a document summary has been added.
- Add New Document links to Explore Methods once contrast data (individual study result data) has been entered and the associated effect size statistics are computed so you can visualize the effects of the new data.
- Explore Tasks links to Explore Methods by interacting with a training method node in the visualization.
- Explore Tasks links to Explore Documents by interacting with a training method or task type node in the visualization.
- Explore Methods links to Document Summaries by interacting with study graphics in the forest plot.
- Explore Documents links to Add New Document by interacting with the “Create New” link from the document view.

Choosing What To Do From the Home Page

The home page is the top level page of TARGET for any user logged into the tool (Figure 11). All other interfaces in TARGET link back to the home page. The home page offers links to each of the four main components of TARGET: Explore Tasks, Explore Methods, Explore Documents and Add New Document. All of the top menu navigation options are also available on the home page (as well as everywhere else in TARGET) including links to Tasks, Methods, Documents, Help, About, Admin (available for administrators only) and Log off.

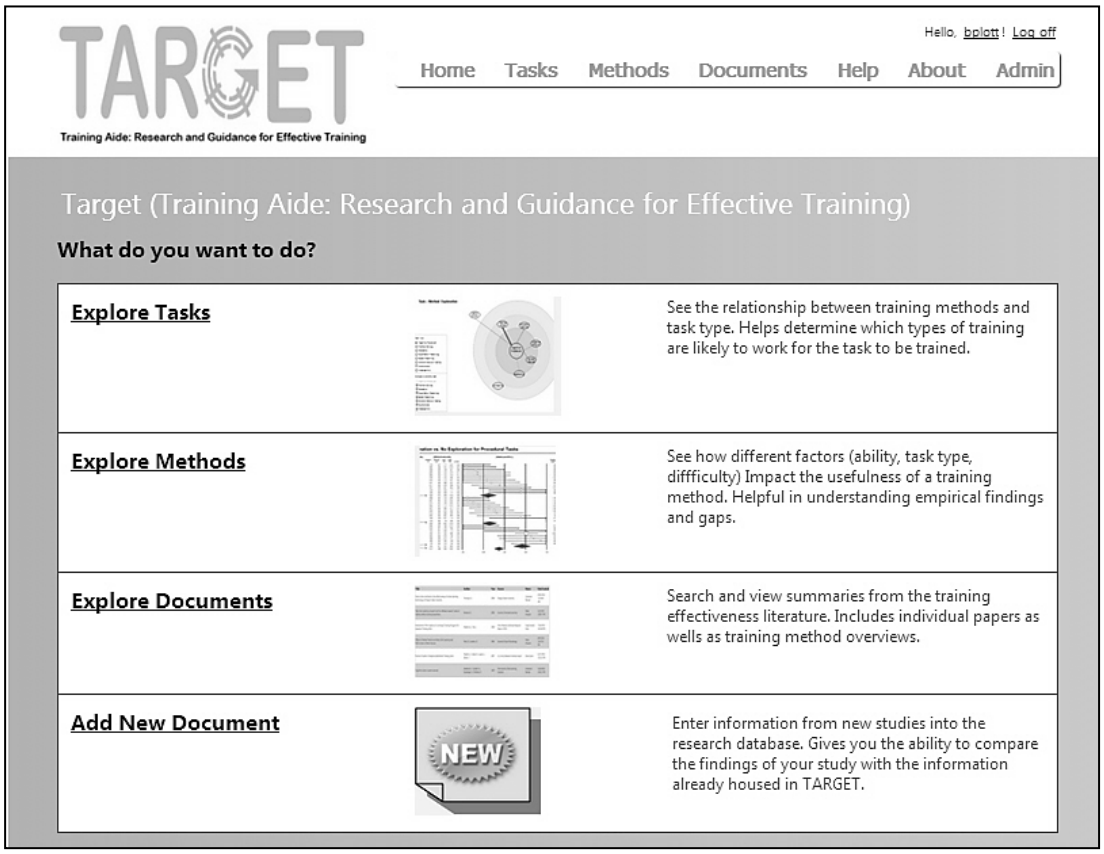


Figure 11. TARGET Home Page

Explore Tasks

This options allows you to visually explore accumulated research evidence of different training methods within specific task types. Click the link to "Explore Tasks" on the left side of the home page. This component is also available through the "Tasks" menu at the top of any interface window.

Explore Methods

This option allows you to visually explore information on the effectiveness of different training methods and moderators of the effectiveness of each training method. Click the link to "Explore Methods" on the left side of the home page. This component is also available through the "Methods" menu at the top of any interface window. Access to Explore Methods may also be gained through interactive links in the Explore Tasks visualizations and Add New Document components.

Explore Documents

This option allows you to search and review the training literature contained in the database of research findings using queries built around document attributes (e.g., training method used, task category, individual factors, delivery method). Click the link to "Explore Documents" on the home page. This component is also available through the "Document" menu at the top of any interface window. Access to Explore Documents may also be gained through interactive links in the Explore Tasks visualizations, Explore Methods forest plots, and Add New Document components.

Add New Document

Choose this option if you wish to enter information from new studies into the research database. Click the link to "Add New Document" on the home page. Access to the Add New Document function may also be gained by selecting the "Create New" link under and Explore Documents components.

Explore Tasks

Visually explore accumulated research evidence of different training methods within specific task types. The task types included in TARGET are shown below:

- *Perceptual*: Skills involved in detecting and interpreting sensory information in order to gain awareness and support performance. The ability to detect and use sensory cues. Include some perceptual reasoning tasks.
- *Psychomotor*: Physical skills - movement, coordination, manipulation, dexterity, strength, and speed; includes both fine motor skills and gross motor skills.
- *Interpersonal*: Social interaction skills, such as: communicate, exchange information, persuade, build and maintain relationships, manage conflict, and interact effectively.
- *Cognitive-Declarative*: This category includes all verbal knowledge categories including facts, principles, knowledge organization, and verbal or graphical mental models, concept maps, etc.
- *Cognitive-Procedural*: This category is meant to include performance of basic procedural skills, where the procedure may include cognitive steps and basic perceptual and motor steps such as those involved in navigating a computer interface. Constrained sequences of physical and cognitive activities performed in predictable situations.
- *Cognitive-Problem Solving*: This category involves application of principles, rules and concepts to process information and solve problems. Includes general logical reasoning skills, such as inductive, deductive, diagnostic skills, etc.
- *Cognitive-Spatial Reasoning*: Visual-spatial skills - skill in representing, transforming, generating, and recalling symbolic, nonlinguistic information. Includes: mental rotation; spatial perception - ability to determine spatial relationships with respect to own body orientation; spatial visualization - multi-step manipulations of spatially presented information, requiring analysis of the relationship between different spatial representations.
- *Cognitive-Quantitative Reasoning*: Application of mathematical concepts and skills to solve problems.
- *Cognitive-Complex Decision Making*: This category involves situation assessment and decision making in complex, dynamic and time-sensitive environments with changing situations, attentional demands, application of strategies, multiple goals, and may involve coordination of perceptual and motor skills.

Overview of Explore Tasks

The Explore Tasks component of TARGET provides you with a range of interactive features for viewing accumulated evidence by task type in order to identify which training methods are likely to be useful in training a particular task type of set of task types (Figure 12). The component provides you with a range of interactive features for viewing accumulated evidence by task type in order to identify which training methods are likely to be useful in training a particular task type or set of task types. The Explore Tasks component offers four functions: (1) View a single task, (2) Compare two tasks, (3) Link to Explore Methods, and (4) Link to Explore Documents.

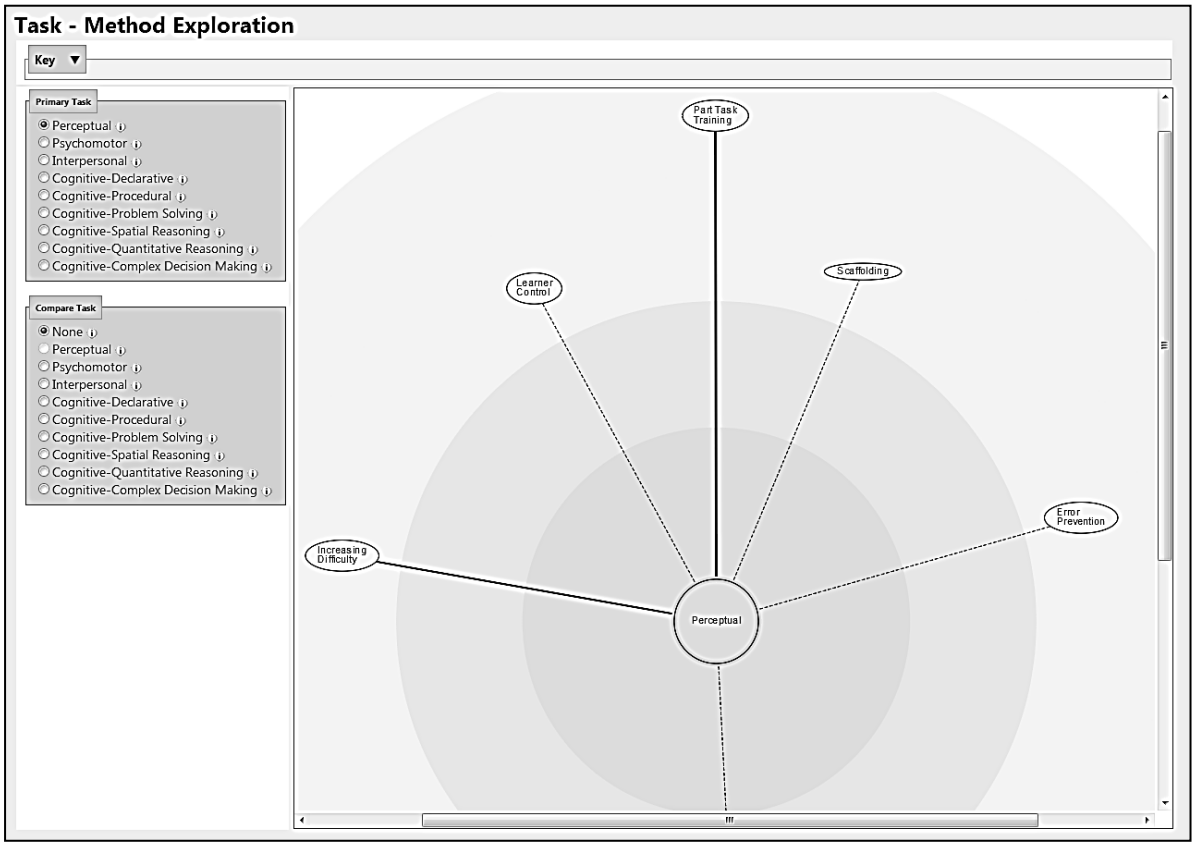


Figure 12. Explore Tasks Page

Explore Tasks – Key

To view the key for the Explore Tasks page, click on the up arrow to the right of the "Key" word, △ . TARGET will expand the Key area as shown below.

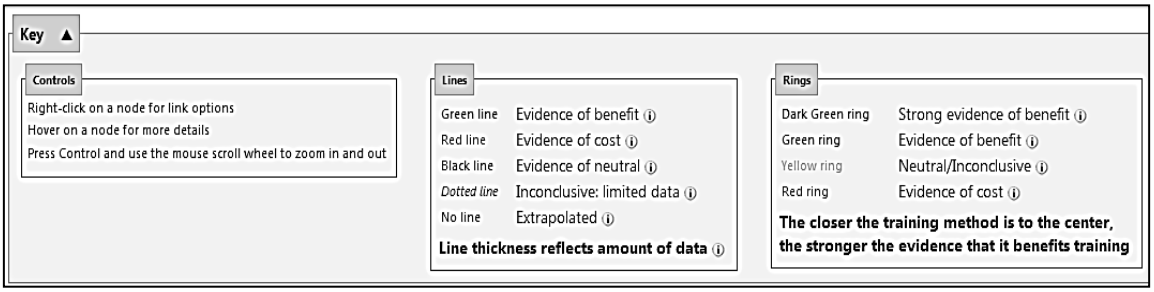


Figure 13. Explore Tasks Key

View a Single Task

The view a single task function allows you to select a task to view the accumulated research evidence of different training methods. **It is important to note that the evidence displayed reflects only on the information contained in the TARGET database**. To view a single task, select one radio button for the desired task from the "Primary Task" options (Figure 14). To view the definition of any of the tasks hover your mouse over the "i" button to the right of the task name.

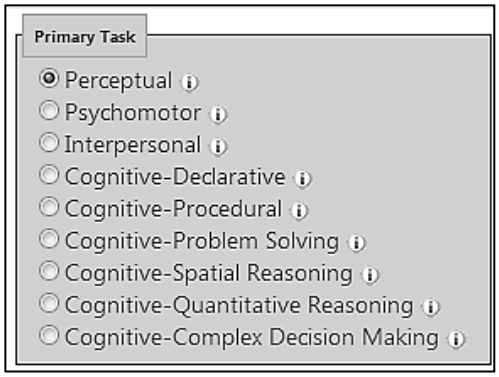


Figure 14. Primary Task Options

Upon selecting a task, the tool graphically displays strength of evidence for cost/benefit on all six training methods for the selected task. The task exploration graphs show a "bull's-eye" with the task type in the middle of the "bull's-eye." The training strategies surround the task type. The closer the strategy to the center, the stronger the evidence that the strategy benefits training transfer performance. A vote count is used to calculate strength of support. The vote count is the percentage of studies related to that task type that showed a benefit of the training strategy being analyzed. For example if there were 10 studies of procedural tasks using the worked example training strategy and 7 of them showed a benefit of worked examples, the vote count is 70%. The goal of this feature is to provide you with "rule of thumb" data regarding the relative usefulness of different strategies.

A "hover over" feature displays a pop up window displaying a ratio of the number of contrasts that show a training benefit to the total number of contrasts for that training method. This information is displayed in a popup window when the cursor is placed on top of a training method node in the graph (Figure 15). In TARGET, a contrast is considered a comparison of treatment group versus control group, primarily defined for the purpose of creating an effect size estimate for the magnitude of the difference in transfer performance between the two groups. Documents may have multiple contrasts when there are a number of different training treatment groups and/or individual difference measures.

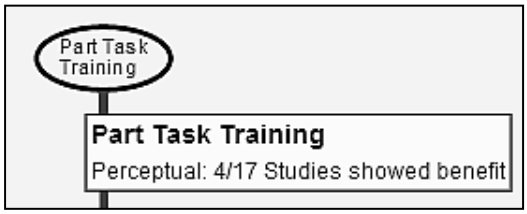


Figure 15. Bubble Graph with Hover Example

The closer the training method is to the center, the stronger the evidence that that method benefits training transfer.

The ring color and distance from the center indicate:

- Dark Green Ring – Strong evidence of benefit
- Green Ring – Evidence of benefit
- Yellow Ring – Neutral/Inconclusive
- Pink Ring – Evidence of Cost

The link type and color indicate:

- Green Line – Evidence of Benefit
- Red Line - Evidence of Cost
- Black Line – Neutral
- Dotted Line – Inconclusive
- No Line – Extrapolated

If the Vote Count was greater than 56%, it was classified as benefit. If the Vote Count was between 44% and 45% it was classified as neutral. If the Vote Count was less than 44%, it was classified as cost. A training strategy was classified as a strong benefit if the number of studies was 6 or greater AND the meta-analysis showed a significant benefit. Strong benefit, benefit, and cost are connected with a regular line as long as there were at least three studies contributing to the vote count. If there were less than three studies, the line is dashed. If there was no data, the there is no connecting line.

Compare Two Tasks

The compare tasks function allows a user to select a second task to view in conjunction with the first. To compare findings for two tasks, select one radio button for the desired comparison task from the “Compare Task” options (Figure 16). To view the definition of any of the tasks hover your mouse over the “i” button to the right of the task name.

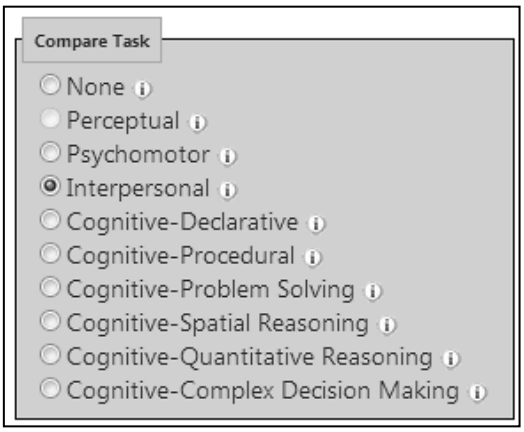


Figure 16. Compare Task Selection

Upon selecting the second task, the tool graphically compares strength of evidence for cost/benefit on all six training methods for the selected tasks. The "hover over" feature works the same as before (Figure 17).

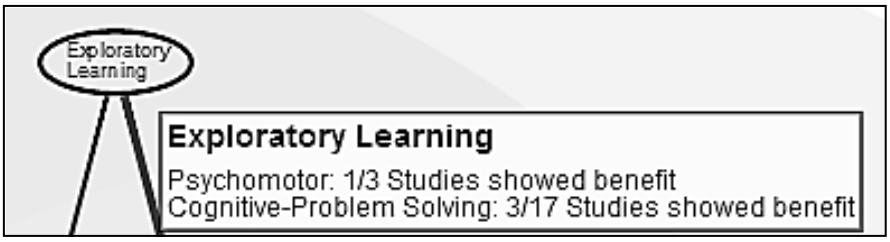


Figure 17. Hover Example for Two Task Types

Link to Explore Methods

The link to the Explore Methods component allows the user to interactively link to the forest plots under the Explore Methods component. To link to the Explore Methods component, right click the training method node, and then select "View Effects Data" by left clicking the link (Figure 18). By interacting with the graphical display of a training method, the user is able to link to and view a forest plot of the selected training method.

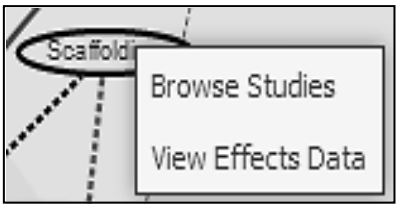


Figure 18. Right Click Menu

Link to Explore Documents

The Explore Documents component allows the user to interactively link to the document summaries under the Explore Documents component. To link to the Explore Documents component, right click any training method node or the task type node, and then select "Browse Studies" by left clicking the link (Figure 18). By interacting with the graphical display of a training method or task type, the user is able to link to and view document summaries for the selected node.

Zooming the Bubble Chart In/Out

You can change the zoom level of the bubble chart visualization by clicking the mouse in the bubble-chart area and then pressing the + (plus) key to zoom in or the – (minus) key to zoom out. Alternatively, you can click in the bubble chart area then hold the Shift and Control keys down while scrolling the middle mouse wheel up to zoom in or scroll down to zoom out.

Panning the Bubble Chart

You can pan the bubble chart view using the scroll bars. Alternatively, you can click in the bubble-chart area then hold the Shift key down while moving the middle mouse wheel to pan horizontally or hold the Alt key down while moving the middle mouse wheel to pan vertically.

Explore Methods

This section of TARGET allows you to visually explore effect size information on the effectiveness of different training methods and moderators of the effectiveness of each training method.

Overview of Explore Methods

The Explore Methods component of TARGET (Figure 19) provides you with interactive forest plots of effect size statistics for a range of studies under one of six training methods: Part Task Training, Increasing Difficulty, Learner Control, Exploratory Learning, Error Prevention, and Scaffolding. The Explore Methods function offers eleven primary functions: (1) View a training method, (2) Explore moderators, (3) View by outcome, (4) Expand/collapse the summary effects, (5) Fixed/random model toggle, (7) Link to single document summary, (8) Effect size extrapolation function toggle, (9) Include new studies function toggle, (10) Include studies with no outcome measures toggle, and (11) Customize the forest plot layout.

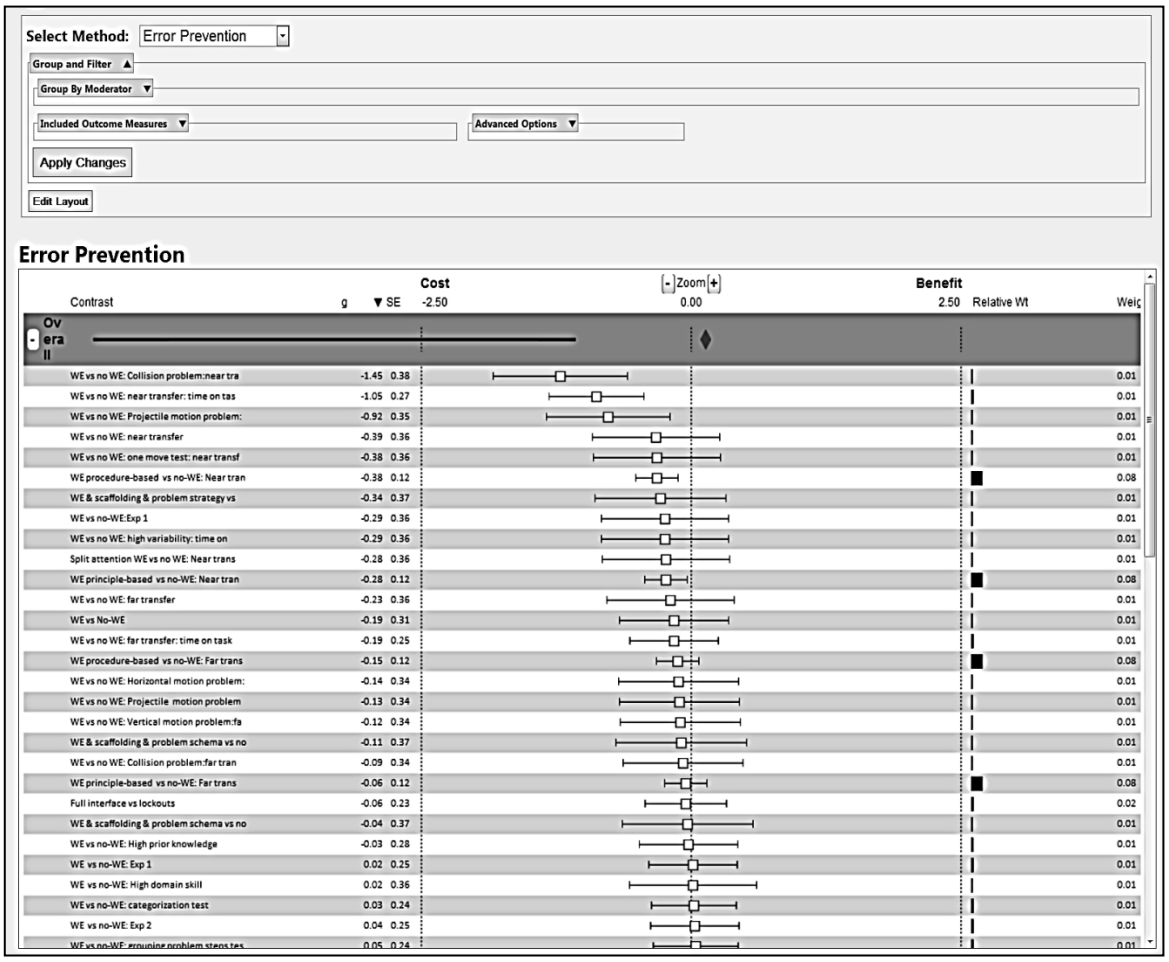


Figure 19. Explore Methods Page

A forest plot is a display that presents a number of means and their confidence intervals in a graphic manner, so that they can be easily reviewed and compared. The forest plot is essentially a number of bars with a square in the middle. The bars represent the confidence interval and the square the hedges's g value. The central vertical line represents no effect. Squares that appear to the left of the vertical line indicate "cost" and squares to right of the vertical line indicate "benefit." The red diamond above the studies represents the overall effect. For more details on forest plots see Hedges and Olkin (1985).

View a Training Method

The first step for viewing a forest plot is selection of a training method. The Explore Methods forest plots are anchored on six training methods: Part Task Training, Increasing Difficulty, Learner Control, Exploratory Learning, Error Prevention, and Scaffolding. To select a training method for the forest plot, highlight and left click the method from the "Select Method" drop-down menu at the top of the window (Figure 20).

Short descriptions of each method are given below.

- *Part task training*: Training method that decomposes complex tasks into a series of smaller tasks, each of which is demonstrated and practiced separately before being practiced as a whole task.
- *Increasing difficulty*: Parameters of the whole task are initially set to lower levels, to reduce the intrinsic load during early training trials, and then increased as training progresses, until the difficulty reaches the level of the whole task. The difficulty levels can increase in either a fixed or adaptive schedule.
- *Learner control*: An instructional method that provides trainees with decision-making control over specific dimensions or activities within a structured learning environment.
- *Exploratory learning*: A trainee explores a task environment on his/her own. The level or type of guidance given to the trainee vary (i.e., only a user manual vs. conceptual input when trainer queried).
- *Error Prevention*: An error prevention strategy geared towards reducing the complexity of the transfer task during initial learning for the purpose of reducing training task errors, and to help trainees acquire the appropriate schema to assimilate the transfer task throughout learning. Utilizes hard lockouts and worked examples.
- *Scaffolding*: Assistive supports are provided to the trainee to ease the demands of independent task performance. The scaffold supports are incrementally faded out over time until the trainee is executing the whole task independently with minimal demand.

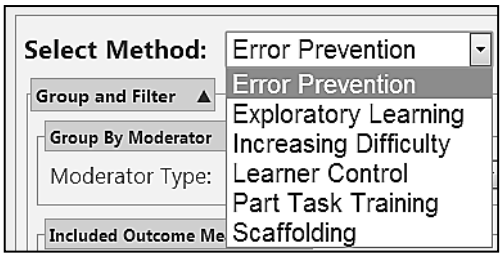


Figure 20. Select Method Drop-Down

Upon selection, a forest plot graphically displays effect size data for all experimental studies in the database using the selected training method (Figure 21). The selected training method will show up as the heading on window. The forest plot will display, for the selected training method, individual study effects as well as a summary effect, shown with a red diamond, representing g+ for the full set of studies shown; where, g+ is equivalent to the mean effect size of all Hedges' g values displayed.

Hedges' g was chosen as the effect size statistic for three primary reasons. First, as an index from the family of standardized mean differences, the standardized scale of Hedges' g allows comparison of the magnitude of the difference between groups across studies. Second, Hedges' g is an effect size index commonly associated with analysis of variance designs thus capturing the overlap between distributions of experimental groups as the standardized mean difference. The majority of the research designs reviewed meta-analytically for training effectiveness studies utilized experimental or quasi-experimental research designs. Third, Cohen's d' index, a common index of standardized mean difference, tends to be an upwardly biased estimate of effect size for small samples. Hedges' g is a sample adjusted correction to Cohen's d' to address the upward bias of d' (Borenstein, et al, 2009; Hedges & Olkin, 1985; Sheskin, 2007).

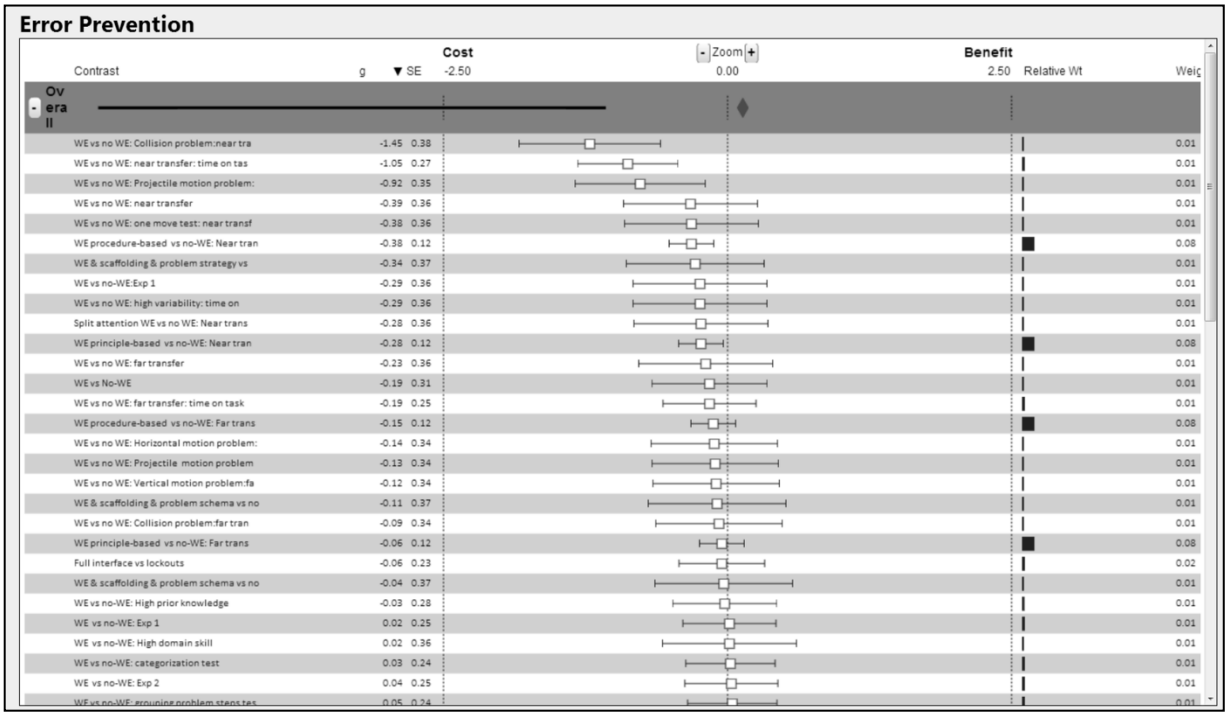


Figure 21. Forest Plot Example

By default, individual study effect g and standard error (SE) data is shown to the right of the study name. To view the overall effect data hover your mouse over the red diamond (Figure 22).

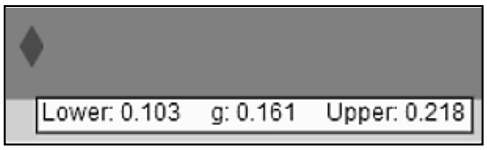


Figure 22. Overall Effects Data Hover

Explore Moderators

The explore moderators function allows the user to filter the research studies displayed on a specific moderator variable. Moderator variables are mutually exclusive options, and consequently can only be selected one at a time. The moderators available include task factors, individual factors, and training method specific factors. The task factors include Task Category and Task Difficulty. The individual factors include Ability and Experience. In addition, a set of 2-3 training method specific moderators will be available for each training method selected. The training method specific moderators are unique to the implementation of each training method.

To select a moderator, highlight and left click the desired moderator from the "Moderator Type" drop-down menu at the top of the window (Figure 23). Then select an individual moderator from the "Moderator" drop-down menu. Once a moderator has been selected from the drop-down menu, click the "Apply Changes" button. All studies shown in the forest plot will be grouped by levels of the selected moderator variable. A separate summary effect, shown with a red diamond, is displayed for each level of the moderator (Figure 24).

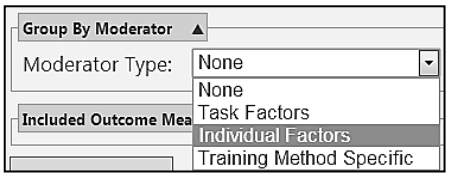


Figure 23. Moderator Type

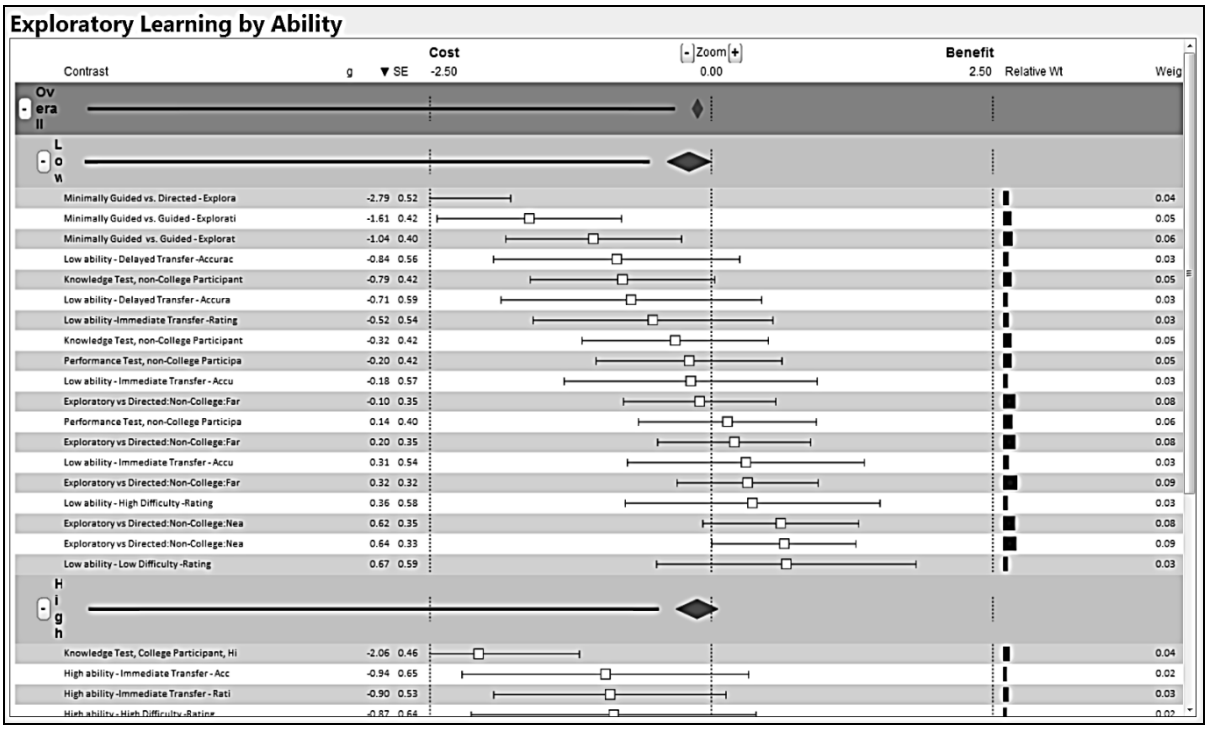


Figure 24. Forest Plot with Moderator Groupings

View by Outcome

The view by "Included Outcome Measure" function allows you to specify further subsets of outcome data to display in the forest plot.

At the top of the filter pane are two options: 1) Check or Uncheck All and 2) No Outcome Measures. Use the "Check or Uncheck All" box to quickly select or unselect all outcome options.

By default all studies in the library database are included in the effect size calculations that meet the boxes checked under the "Included Outcome Measures" filter area. You can optionally include studies that do not have defined outcome measures. To turn the inclusion of studies with no outcome measures off/on, uncheck/check the check box menu next to "No Outcome Measures."

Three outcome options are: (a) Transfer test type, (b) Transfer measure type, and (c) Transfer distance type (Figure 25). You can hover your mouse over the "i" to the right of the outcome options to view definitions.

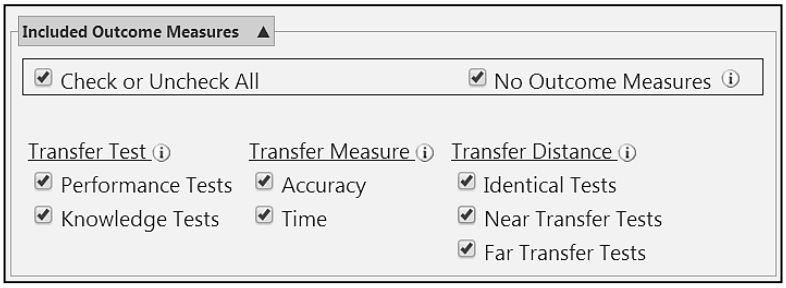


Figure 25. Outcome Measures Filter Pane

Two options are available for Transfer Test type: Performance Tests and Knowledge Tests. *Performance tests* capture the ability of a trainee to physically performance a trained skill. *Knowledge tests* capture the ability of a trainee to recall information or problem solve from a trained skill.

Two options are available for Transfer Measure type: Accuracy measures and Time measures. *Accuracy measures* capture features of performance related to correctly performing a transfer task. *Time measures* capture features of performance related to the time to respond, perform an action, or complete a task.

Three options are available for Transfer Distance type: Identical Tests, Near Transfer Tests, and Far Transfer tests. *Identical tests* examine the application of what was learned in training using a task or problem identical to that used during training. *Near transfer tests* examine the application of what was learned in training using a task or problem somewhat different, but similar, to that used during training. *Far transfer tests* examine the application of what was learned in training using a testing situation that is different or new from the task or problem that was used in training.

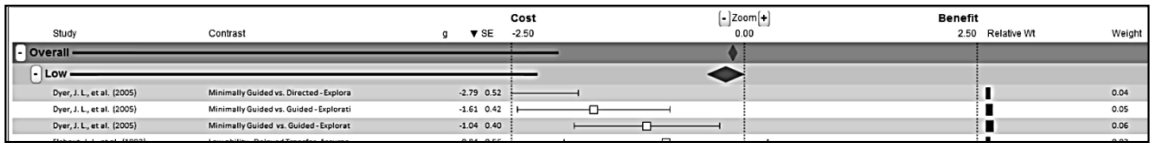
Outcome filtering is not mutually exclusive, so any number of options within each of the three outcome types may be selected at one time. To select an outcome type, check the box next to the outcome measures to filter on. The forest plot will refresh after you select the "Apply Changes" button.

Expand/Collapse the Summary Effects

The expand/collapse function allows you to interact with the forest plot display in order to expand the view to include effect size data for all studies or collapse the view to include only the summary effects. A fully expanded view showing all studies is the default view.

To collapse all studies and moderator summary effects, left click the grey rectangle displaying a minus sign to the left of the "Overall" label. The overall summary effect will be the only effect size information displayed as shown in Figure 26.

Expanded



Collapsed

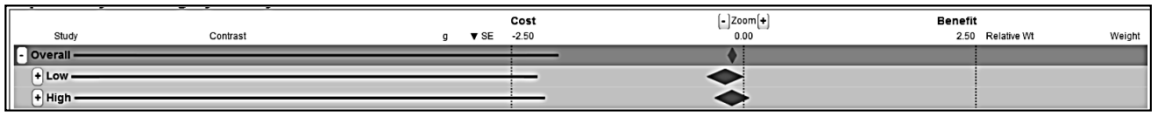


Figure 26. Expanded and Collapsed Summary Effects

To expand the overall summary effect and view all studies for the selected training method, left click the grey rectangle displaying a plus sign [+] to the left of the "Overall" label.

Similarly, the levels of a moderator variable may be collapsed by left clicking the grey rectangle displaying a minus sign to the left of the moderator label when all studies for that moderator level are displayed. To expand, left click the grey rectangle displaying a plus sign to the left of the moderator label when all studies for that moderator level are hidden.

Link to Single Document Summary

The link to a single document summary under the Explore Documents component allows you to interactively link to the details of single research study by interacting with the individual study graphics. To link to a single document summary under the Explore Documents component, left click the specific study name in the forest plot (Figure 27).

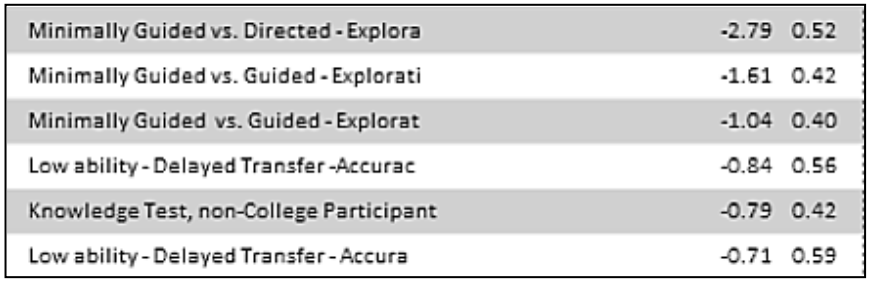


Figure 27. Single Document Link

Once selected, you will switch views to the *document details* function under the Explore Documents component of TARGET showing the document details of the specific study selected (Figure 28).

Figure 28. Document Details Page

Advanced Options

TARGET provides several advanced filtering options. To view the available options (Figure 29), click the down arrow next to the "Advanced Options" text. Each of the options is described below.

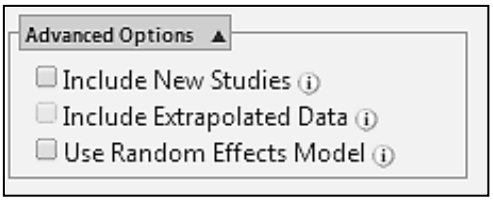


Figure 29. Advanced Options - Include New Studies

You have the option of viewing effect size data for just library data or for library data plus any new research studies that you have entered. The "Include New Studies" option allows you to toggle on or off the inclusion of your new studies (studies that have not yet been approved by an administrator).

To turn the new study inclusion off/on, uncheck/check the check box menu next to "Include New Studies" in the "Advanced Options" filter area (Figure 29). This option only impacts new documents/contrasts added by you.

Include Extrapolated Data

The "Include Extrapolated Data" option allows you to toggle on or off the utilization of an extrapolation algorithm in the computation of effect sizes for combinations of variables that do not have supporting effect size data in the tool. For a more detailed discussion of the extrapolation algorithm see Hutchins, Carolan, Plott, McDermott, & Orvis (2014).

The extrapolation algorithm utilizes a parent effect process by leveraging higher level effects in data sets where the combinations are available to approximate an effect size.

TARGET can use an effect size extrapolation process to estimate effect sizes for two types of moderator combination subsets. The first type involves estimating an effect size for outcome variable subsets (i.e., all contrasts that combine performance tests, accuracy measures, and near transfer) that are not represented within the training method contrast data set, based on the missing attribute (e.g., near transfer) "parent" effect size value (i.e. performance tests, accuracy measures, all transfer distances). The second type of subset combination in TARGET includes one of the other moderators (Skill Type, Task Difficulty, Ability, Experience, or Training Method Specific moderators) with one of the 12 combinations of three outcome moderator variables.

Two heuristics restrict the extrapolation range. First all extrapolation is within the training method (e.g., scaffolding) data set. Second, there must be at least one data point in a set of training method contrasts for a moderator variable (e.g., Scaffolding: Transfer Distance: Near Transfer) to be used as an extrapolation source. Therefore moderator variables with no study contrast data (e.g., Scaffolding: Transfer Distance: Far Transfer) are excluded from estimation by extrapolation in TARGET. (In these cases the parent moderator (e.g., Scaffolding: Transfer Distance), or with a theoretical basis, a sibling moderator variable (e.g., Scaffolding: Transfer Distance: Near Transfer) is the best available effect estimate within the training method data set.)

You can only select "Include Extrapolated Data" if the conditions are met – one choice from each Measure (Transfer Test, Transfer Measure, Transfer Distance). Extrapolated data is indicated by an orange diamond (Figure 30). Hover over the Orange diamond – that will give you g and the upper and lower bounds of the Confidence Interval from the extrapolation.

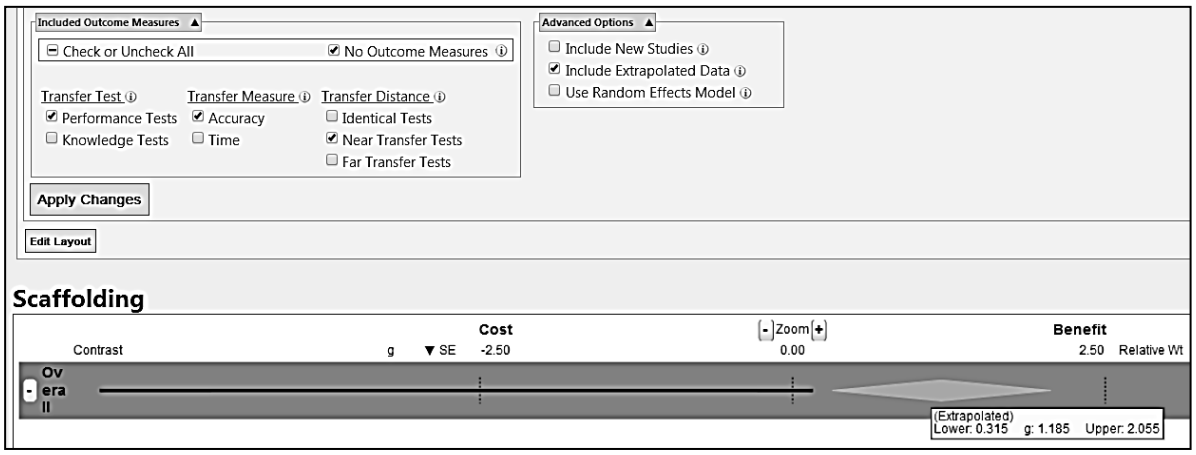


Figure 30. Extrapolated Data

To turn the extrapolation algorithm off/on, uncheck the check box menu next to "Include Extrapolated Data" in the "Advanced Options" filter area (Figure 29).

Fixed Effect or Random Effects Model Toggle

TARGET dynamically calculates overall or combined effect from a variety of studies so that you can see if the literature shows that a particular training method shows a cost, a benefit, or is inconclusive. If all studies were equally precise you could simply compute the mean of the individual effect sizes. However, typically some studies are more precise than others so we want to assign more weight to the studies that carry more information. There are two models that can be used to assign the weights: a fixed effects model and a random effects model. The two make different assumptions about the nature of the studies, and these assumptions lead to different calculations of the overall effect.

Fixed effect models assume a single source of variation between effect sizes due only to sampling error (i.e., within-study variance). The assumption of a fixed effect model is that each contrast's effect size is a sample from a distribution of effect sizes around a true population mean. Consequently, the only source of variation around the true population mean is random variation of each contrast's estimate from the true mean. A fixed effect model is typically chosen when the modeler assumes that each study is an equivalent context of training assessment; that is, each experimental study is assumed to be estimating the same true population effect rather than different population effects associated with between study differences in training environment, sample characteristics, training tasks, etc. The single variation parameter associated with the assumption a single true population mean and random variation of each contrast's estimate around that mean is used to compute the set of fixed effect quantities that are later used to compute the fixed effect model summary statistics (Borenstein, Hedges, Higgins & Rothstein, 2009).

In contrast to the fixed effect model, the assumption of a random effects model is that each contrast's effect size is a sample from a distribution of effect sizes around a unique population

mean. Consequently, two sources of variation exist for the random effects model: random variation of the sample from the distribution around the unique population mean, and random variation of the sample from the mean of the distribution of unique population means.

A random effects model is typically chosen when the modeler assumes that each study represents a different context of training assessment; that is, each experimental study is assumed to be estimating a different population mean due to between study differences in training environment, sample characteristics, training tasks, etc. The random effects model summary statistic is a calculation of the mean of the distribution of different unique population parameters. Therefore, random effects models assume two sources of variation, within-study variance (as in the fixed effect model) and variation due to true differences between effect size estimates (i.e., between-studies variance).

The fixed/random model toggle function allows you to switch between a fixed effect and random effects models for the computation of summary statistics. A fixed effect model is the default model in TARGET.

To select a random effects model, check the box to the left of "Use Random Effects Model" under the "Advanced Options" filter area (Figure 31) and click the "Apply Changes" button. To go back to a fixed effect model, simply uncheck the box and click the "Apply Changes" button.

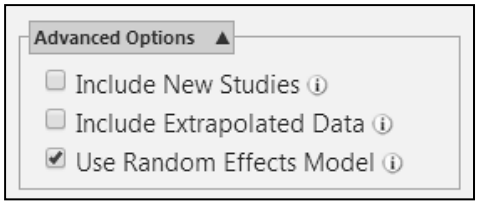


Figure 31. Advanced Options

Whenever the random effects model check box is checked or unchecked and the "Apply Changes" button is clicked, all summary effects, both overall and for each moderator variable, will be recomputed to reflect the selected model.

Edit Layout

You can change the way the forest graph is displayed using the Edit Layout functionality. To view/edit the layout, click on the "Edit Layout" button. TARGET will display a frame similar to Figure 32. From here you can choose what information to display and set the width used for each piece of information. To have display a category of information, check the box to the right of "Visible:" – similarly to not show something uncheck the "Visible:" box. To set the width of each column you can either enter a number in the "Width:" field or use the up/down arrows to increase/decrease the width. Once you have made all the desired changed to the layout, click the "Accept Changes" button at the top of the frame.

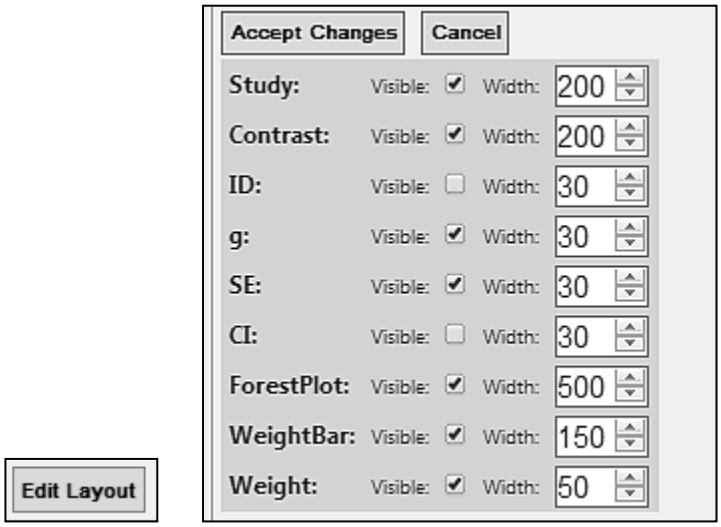


Figure 32. Edit Layout Button and Options

The available fields are:

- Study: Contrast short name.
- Contrast: Short contrast description.
- ID: Database ID.
- g: Hedge's g
- SE: Standard Error
- CI: 95% Confidence Interval
- ForestPlot: Plot of effect data in a graphical display
- WeightBar: Graphical display of relative weight of contrast data
- Weight: Relative weight of study contrast

To disregard any layout changes click the "Cancel" button.

Explore Documents

Search and review the training literature contained in the database of research findings with queries built around document attributes (e.g., Training Method, Author Name, Year Published, Document Type, Document Title, and Reviewer).

Overview of Explore Documents

The Explore Documents component of TARGET provides users with a searchable database of literature summaries. The Explore Documents component offers four functions: (1) View document summaries, (2) Create a new document, (3) View/Edit Author list, and (4) View/Edit Data source list (Figure 33). The documents are shown by default with 20 documents per page. The following columns are shown: Title, Authors, Year, Document Source, Report Type, Date Created, and Created By.

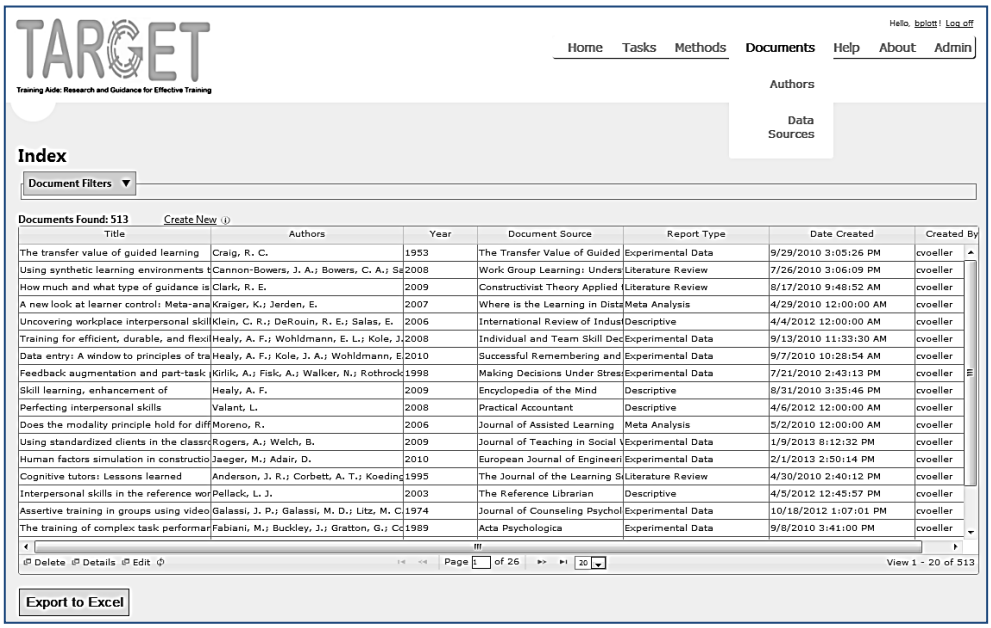


Figure 33. Explore Documents

You can change the number of items displayed per page to 10, 20, or 30 by selecting the appropriate choice in the drop-down control at the bottom of the list (Figure 34).

You can navigate between pages using the page controls at the bottom of the list or by entering a page number in the text field to the right of "Page." The controls are:

- Next - - go to the next page
- Last - - go to the last page
- Previous - - go to the previous page
- Beginning - - go the first page

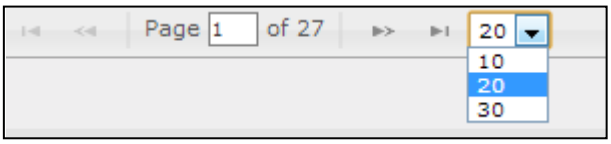


Figure 34. Document List Page Controls

Sorting the Document List

You can sort the document list by any of the displayed columns (Title, Authors, Year, Document Source, Report Type, Date Created, or Created By). To sort in ascending order simply click on the column heading – TARGET will sort the list and display arrows with the up arrow highlighted next to the column name . To sort in descending order, click on the column heading then click on the down arrow .

Document Filters

The Document Filters functionality allows you to view individual document summaries by document attribute. You can select various document attributes and view the individual document summaries by expanding the Document Filters area at the top of the page by clicking the up arrow, △. The default view without filters for the Explore Documents component is to show all documents in the database (Figure 35).

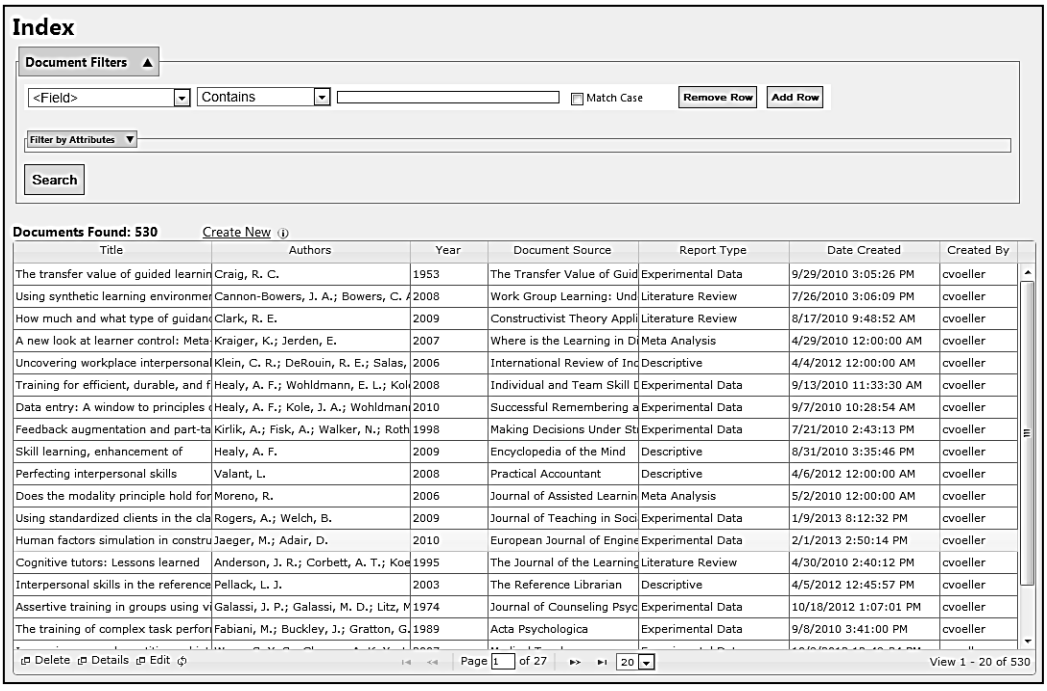


Figure 35. Explore Documents with Document Filters

To view a subset of document summaries, two filtering options are available: keyword Boolean searches and/or filtering by attributes. To filter on keywords, expand the Document Filters area by clicking the down arrow. Then select both the term fields and Boolean logic by using the drop-down menus, and then enter the keywords (Figure 36). The available fields, Boolean logic, and search options are shown in

You can toggle on/off matching the keyword case by clicking the "Match Case" checkbox. Once your filter criteria have been set, click on the Search button. TARGET will display all documents that meet the filter criteria.

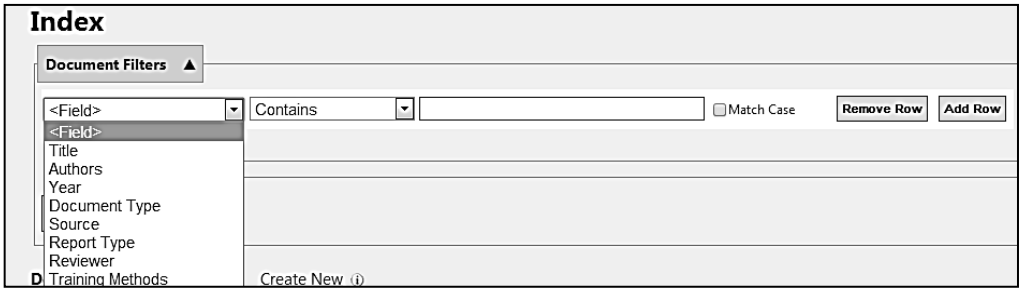


Figure 36. Keyword Search

Table 1. Document Filter Options

Field	Description	Boolean Logic	Search Option(s)
Title	Name of the document	Contains, Does Not Contain, Matches Exactly	Free Text (Match Case option)
Authors	Name of one or more authors	Contains, Does Not Contain, Matches Exactly	Free Text (Match Case option)
Year	Year document published	Is In Range, Is Not in Range	From Date Drop-Down, To Date Drop-Down
Document Type	Area in which the document was published	Is, Is Not	Drop-down selection (Book, Book Chapter, Journal Article, Technical Report, Conference Paper, Dissertation)
Source	Name of data source document is appears in	Is, Is Not	Drop-down selection
Report Type	Category of document focus	Is, Is Not	Drop-down selection (Experimental Data, Meta Analysis, Training Evaluation, Literature Review, Descriptive)
Reviewer	User name of person who created the document record	Contains, Does Not Contain, Matches Exactly	Free Text (Match Case option)
Training Methods	The type of training reviewed in the document	Include, Do Not Include	Drop-down selection (Error Prevention, Exploratory Learning, Increasing Difficulty, Learner Control, Part Task Training, Scaffolding)

You can filter the search using multiple criteria by clicking on the "Add Row" button and specifying the additional field(s) and search options and clicking the Search button. For example, in the figure below TARGET will search for all documents that are of Training Method type "Part Task Training," were published between 2000 and 2013 and are Journal Articles. To delete any of the extra search criteria click on the "Remove Row" button and TARGET will delete the associated row.

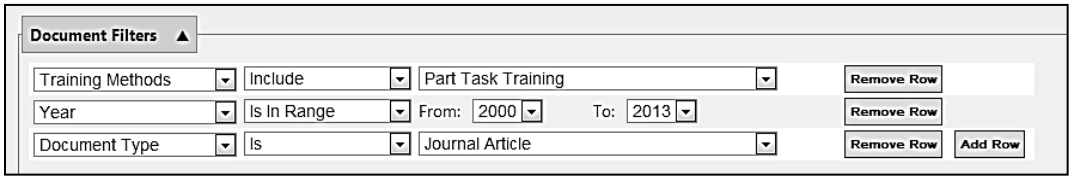


Figure 37. Multiple Criteria Filter

Document Attribute Filters

To filter on document attributes, expand the select the document attributes by clicking the "Filter by Attributes" down arrow. Next, select attributes by checking the box next to each attribute of interest. Multiple boxes under each category can be checked simultaneously (Figure 38).

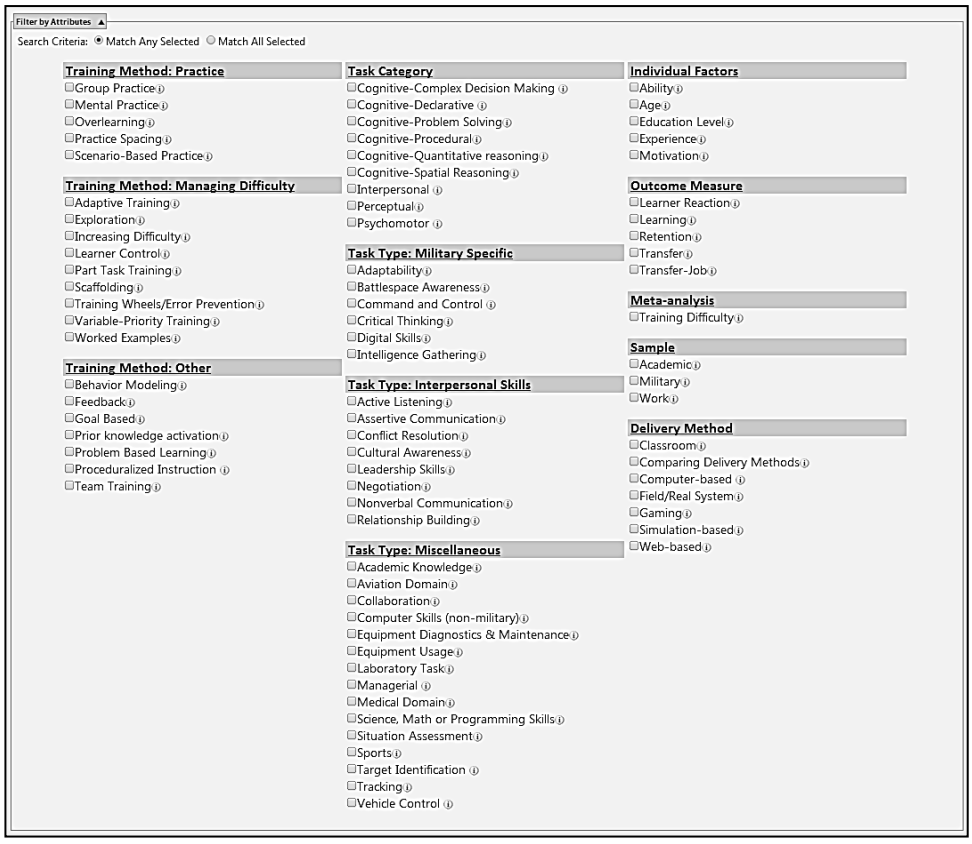


Figure 38. Filter by Attributes

Definitions of each attributes are shown in Appendix A. You can also view attribute definitions by hovering your mouse over the "i" to the right of any attribute.

Once all desired attributes have been selected, left click the "Search" button at the bottom right of the attribute window. A filtered list of studies is displayed in the scrolling list at the bottom of the window.

Export to Excel

You can export the document list contents to excel by clicking the "Export to Excel." TARGET will create a file named grid.xls in the download folder of your computer (by default the folder is c:\Users*username*\Downloads). The exported file is on Microsoft Excel 97-2003 format. The excel file contains all of the fields on the index document list display (Figure 39).

	A	B	C	D	E	F	G
1	Title	Authors	Year	Document Source	Report Type	Date Created	Created By
2	The training of complex task performance	Fabiani, M.; Buckley, J.; Gratton, G.; Coles, M.; Donchin, E.; Logie, R.	1989	Acta Psychologica	Experimental Data	9/8/2010 15:41	cvoeller
3	Contributions of a part-task trainer to the learning and relearning of a time-shared flight maneuver	Adams, J. A.; Hufford, L. E.	1962	Human Factors: The Journal of the Human Factors and Ergonomics Society	Experimental Data	9/7/2010 7:41	cvoeller
4	Part-whole practice of movement sequences	Park, J. H.; Wilde, H.; Shea, C. H.	2004	Journal of Motor Behavior	Experimental Data	9/13/2010 23:56	cvoeller
5	The relative efficiency of several training methods as a function of transfer task complexity	Briggs, G. E.; Naylor, J. C.	1962	Journal of Experimental Psychology	Experimental Data	9/7/2010 7:58	cvoeller
6	Transfer of skill from a computer game trainer to flight	Gopher, D.; Weil, M.; Bareket, T.	1994	Human Factors: The Journal of the Human Factors and Ergonomics Society	Experimental Data	7/9/2013 7:07	cvoeller

Figure 39. Excel Export File

Document Details

To modify or view further details of any individual document, first select the row that the desired document is on, then select the "Edit" or "Details" hyperlink at the right side of each study (Figure 40). To delete a document click the "Delete" hyperlink. ***Note: as a contributor you will only be able to edit and delete documents that you created.***

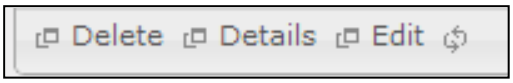


Figure 40. Document Hyperlink Menu

Selecting "Edit" or "Details" will display details about the individual document. The "Details" page contains the following text fields: title, authors, publication year, citation, abstract, document type, data source, report type, and document creator (Figure 41).

Hyperlinks are available at the bottom of the window for different types of document information: Summary Details, Attribute Details, Contrasts, and Back to List (Figure 41). Edit is also available if you created the record or are an Administrator user type.

Figure 41. Example Details Page with Hyperlink menu at the bottom

Summary Details

The "Summary Details" link takes you to the Document Summary page that contains the following text fields: brief research study description, the training methods reviewed in the research study, the tasks/skills reviewed in the study, the theoretical framework and/or conceptual framework of the study, overall findings, training method specific findings, findings relevant to outcome criteria, findings relevant to task/skill differences, findings relevant to individual differences, other findings, author conclusions, and user comments (Figure 42).

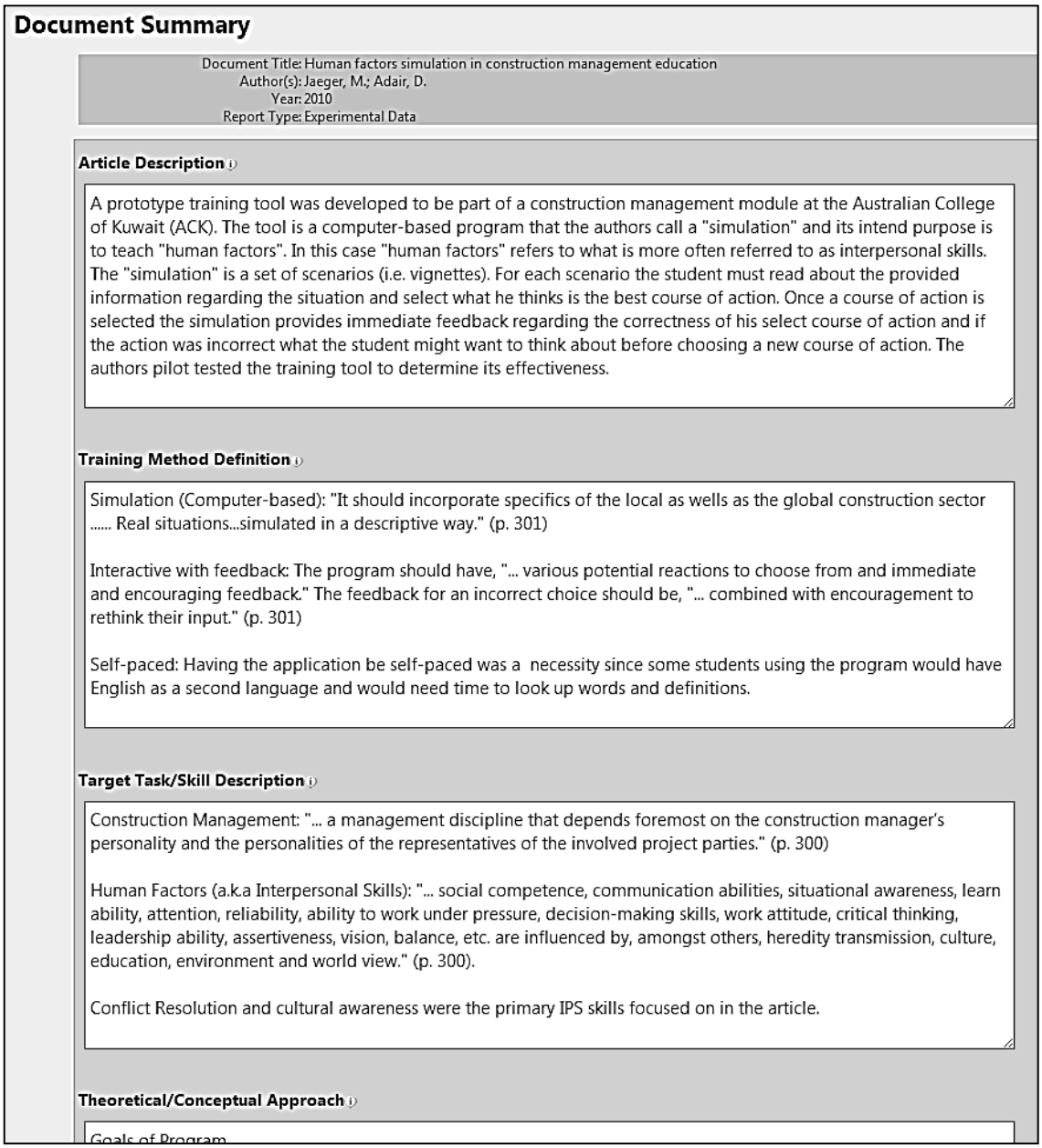


Figure 42. Document Summary Page

The fields are described in Table 2 and can be seen by hovering the mouse over the “i” next to any field.

Table 2. Summary Field Descriptions

Field	Description
Article Description	A free text field designated for a high level summary of the document, e.g., purpose, what was examined, and what was found
Training Method Definition	A free text field designated for a description of the training methods examined/described in the document
Target Task/Skill Description	A free text field designated for a description of the tasks or skills addressed in the document.
Theoretical/Conceptual Framework	A free text field designated for a description of the conceptual framework or theory that frames the content of the document, if relevant
Overall Findings	A free text field designated for description of the main findings of the document, if relevant
Findings by Training Method	A free text field designated for description of specific findings relative to the training method(s) examined in the document
Findings by Outcome Criteria	A free text field designated for description of specific findings relative to the outcomes measured in the document.
Findings by task or skill type	A free text field designated for description of specific findings relative to the task or skill categories examined in the document
Findings by Individual Factors	A free text field designated for description of specific findings relative to the individual differences between study participants, e.g., experience, ability, or age
Other relevant findings or guidelines	A free text field designated for description of additional findings relevant to training that are not captured above under findings by method, task/skill, or individual differences
Author Conclusions	A summary of the key points summarized by the document author(s)
Reviewer Comments	A free text field designated for the user/creator to add relevant comments or information regarding the document

Attribute Details

The "Attribute Details" link takes you to the Document Attribute page that shows you all applicable attributes coded for this document. The document attributes are the same ones that are available to filter documents with or to code a document for under the "Add New Document" feature (Figure 43). For descriptions of each attribute see Table 2 or hover the mouse over the "i" next to each attribute.

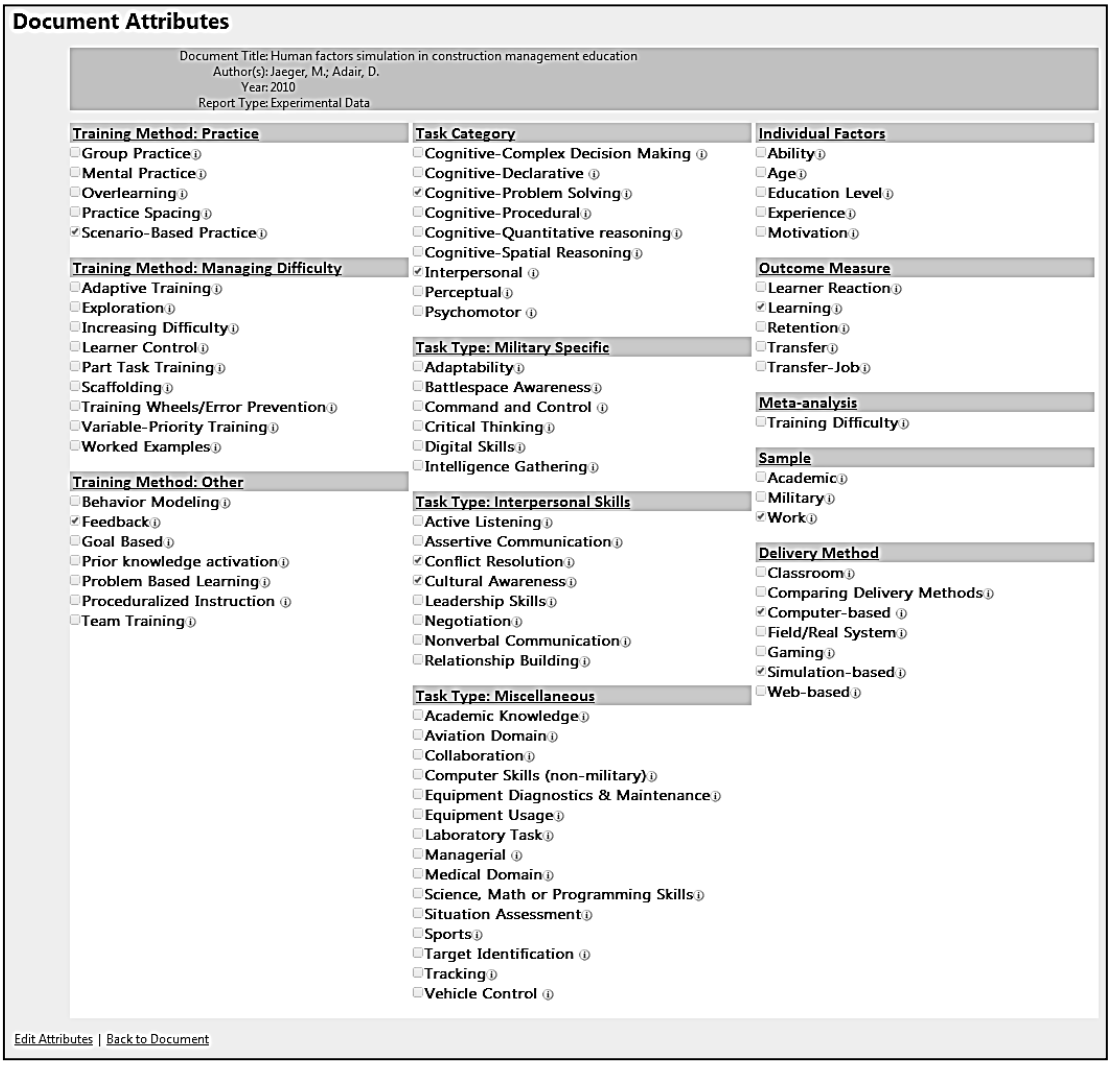


Figure 43. Document Attributes Page

Link to Add New Document function

The Add New Document function links to the component for adding new user documents (e.g., a new research study). To add a new document, left click the "Create_New" hyperlink in the top left of the document list window (Figure 44). The link will take you to the first page of the component for adding new user documents to the database. Once selected, you will switch pages to the Add New Document component where you can begin adding document level attribute information such as the title, authors, document type, etc.

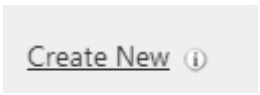


Figure 44. Create New Hyperlink

Adding New Documents

Users can enter information from new documents (e.g., a new research study) into the research database and compare the findings with the information already in TARGET.

Overview of Add New Document Feature

The Add New Document component of TARGET provides users with the capability to add new document/research studies to the database and keep TARGET up to date with the latest literature. New studies can be document coded only, document coded with a summary, document coded with study data for effect size computations, or all three. The Add New Document component offers four functions: (1) Create document, (2) Code document attributes, (3) Add document summary, and (4) Add contrasts for effect size calculations.

To add a new document from the home page, select the blue "Add New Document" link. This component is also available through the "Create New" tab at the top of the Documents page. This feature is available to all users.

Creating a New Document

The first window of the "Add New Document" component presents a set of fields that are the minimum required document attributes that must be entered in order to create a new document (Figure 45).

Figure 45. Create Window

Creating a new document is the first step in adding a new document to the database. Here, basic information for a new document is entered and saved. The minimum information requirements to create a new document are as follows:

- Title – The title of the published document.
- Author(s) – All author names, in the order listed on the publication, entered in standard APA format last name, first initial.
- Year – The year the document was published.
- Document Type – Identifies the document source as a journal article, book, conference paper, etc.
- Data Source – Identifies the name of the publication, such as Journal of Educational Psychology, Journal of Applied Psychology, etc.
- Report Type – Identifies the type of publication, such as a Meta-Analysis, Experimental paper, Literature review, etc.
- Citation – Standard APA format citation including authors, year, title, and source information.
- Abstract – Cut & paste from publication if available. Typically includes a summary of main points such as: objective, background, method, results, and conclusion.

Two fields are automatically generated by TARGET when you create a new document.

- Reviewed By – Identifies who created the study. This field is automatically populated with the creator's username.
- Date Created – Identifies the date that the document was created. This field is automatically populated by the tool.

The user clicks the "Create" button to create the document in the database. Once the document has been created, the user may code additional document attributes, add qualitative document summary information, define specific contrasts for effect size calculations, code the study-level attributes specific to each contrast, select the type of data to enter for each contrast, and enter statistics for effect size computation.

Once created, TARGET will display the Document Details page showing the information you just entered. Now, you may choose to edit the details, create summary info, code for attributes, add contrasts for effect size calculations using the menu at the bottom of the page, or go back to the document list (Figure 46).

Figure 46. Document Details page Hyperlink menu options

Adding a New Author

To add a new author, click on the "Add an Author" button – TARGET will display the author drop-down list. Scroll to the top of the list and select <New Author>. TARGET will display fields to enter the new author's last name and first name (Figure 47). Enter the author's first and last names into the appropriate fields and click the "Create New Author" button.

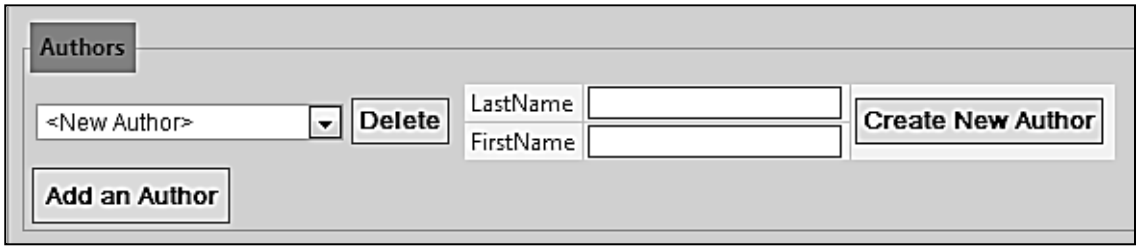


Figure 47. Add New Author

Adding a New Data Source

To add a new data source, scroll to the top of the "Data Source" drop-down list and select <New Data Source>. TARGET will display a field to enter the new data source title. Type the name of the new data source and click the "Create New Data Source" button.

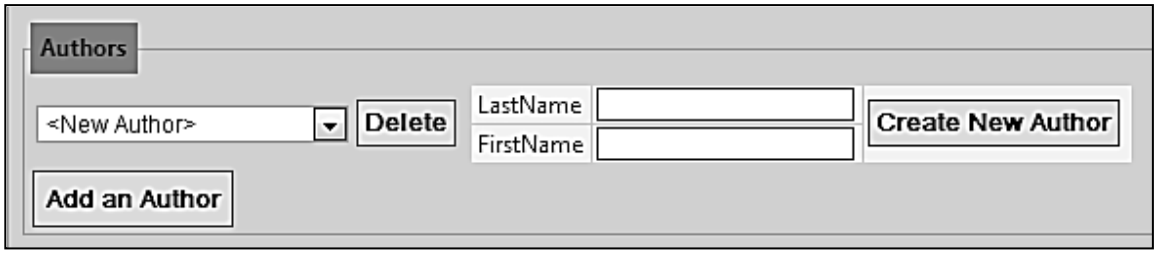


Figure 48. Add New Data Source

Add Document Summary

Documents may also be characterized by qualitative descriptions of the research study's purpose, design, findings, and conclusions. The "Summary" feature under Add New Document allows the user to summarize elements of a study by typing in summary information (Figure 49). The feature utilizes free text fields where users type information directly into the field. The available free text fields include:

- Article description – A free text field designated for a high level summary of the document (e.g., purpose, what was examined, and what was found).

- Training methods reviewed – A free text field designated for a description of the training methods examined/described in the document.

- Theoretical/conceptual frameworks – A free text field designated for a description of the conceptual framework or theory that frames the content of the document, if relevant.

- Overall findings – A free text field designated for description of the main findings of the document, if relevant.

- Findings by training method – A free text field designated for description of specific findings relative to the training method(s) examined in the document.

- Findings by outcome criteria – A free text field designated for description of specific findings relative to the outcomes measured in the document.

- Findings related to task/skill type differences – A free text field designated for description of specific findings relative to the task or skill categories examined in the document.

- Findings related to individual differences – A free text field designated for description of specific findings relative to the individual differences between study participants (e.g., experience, ability, or age).

- Other relevant findings or guidelines – A free text field designated for description of additional findings relevant to training that are not captured above under findings by method, task/skill, or individual differences.

- Author conclusions – A summary of the key points summarized by the document author(s).

- Reviewer comments – A free text field designated for the user/creator to add relevant comments or information regarding the document.

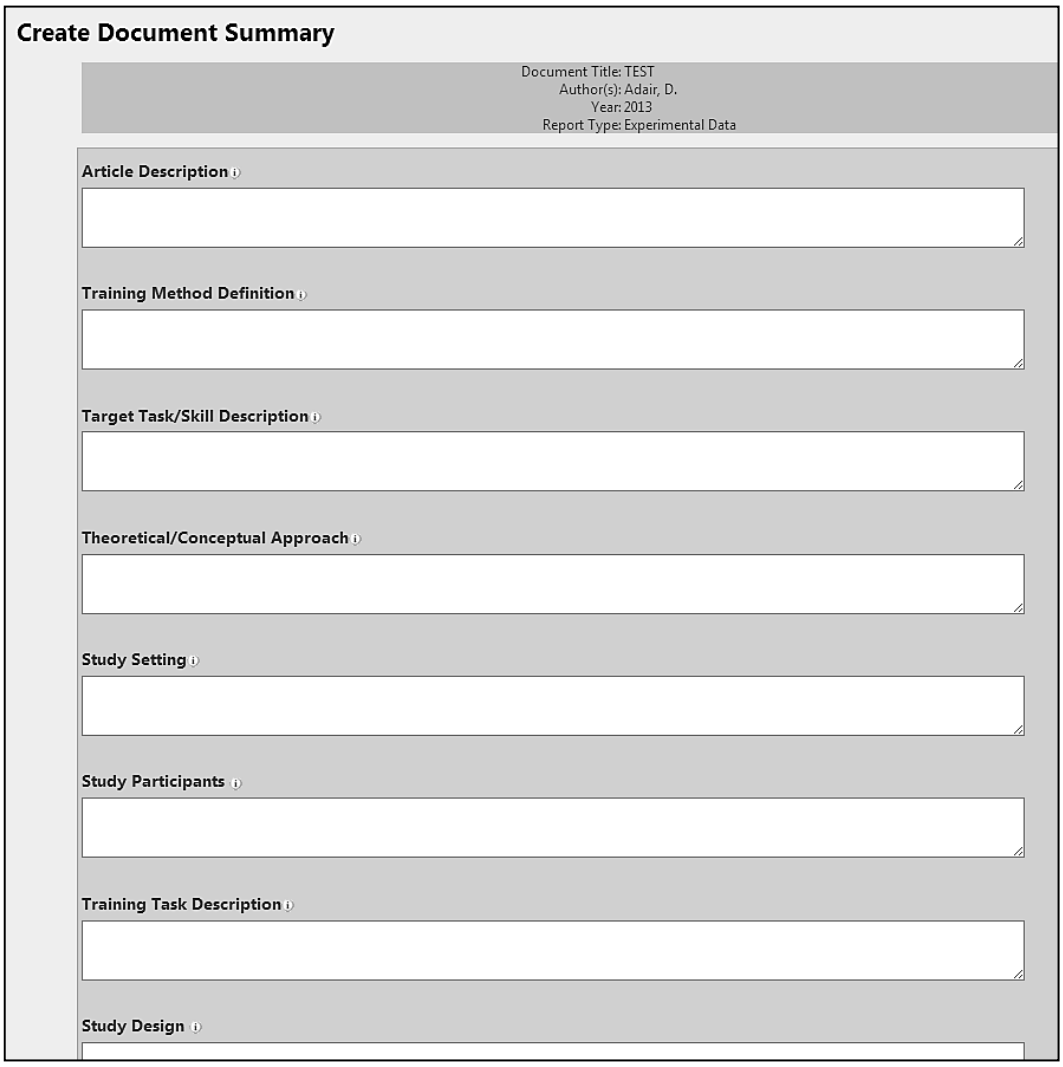


Figure 49. Create Document Summary Page

Select the "Save" button to save the qualitative descriptions in the database.

Code Additional Document Attributes

A large number of additional document attributes may be coded for the new document once it has been created. To code additional attributes, click on the "Create Attributes" link at the bottom of the Document Details window – define and describe all available attributes (Figure 50). Select desired attributes with the radio buttons and check boxes. Definitions for all attributes can be found in Appendix A – Attribute Definitions or by hovering your mouse over the "i" to the right of each attribute.

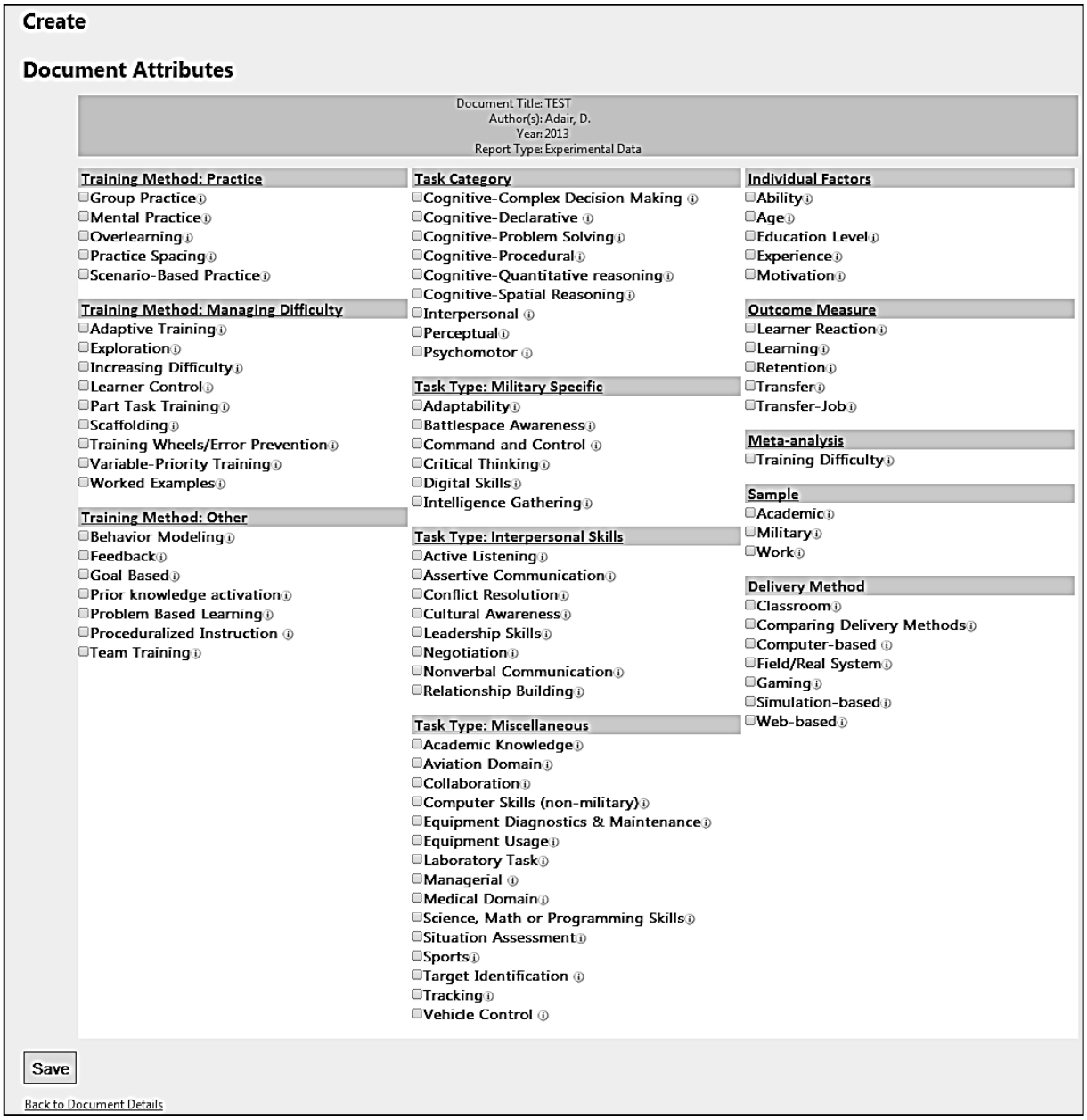


Figure 50. Create Attributes Page

Select the "Save" button in the bottom left corner to save the selected attribute codes to the database for the new document.

Define Specific Contrasts for Effect Size Calculations

For the new document, users may also define one or more specific contrasts to be used in effect size computations within TARGET. There are four steps to adding contrasts with effect size data to the database. The first step is defining the contrasts to be entered. The set of contrasts are entered under the "Contrasts" link on the Document Details Page. This will take you to the Contrasts Index page (Figure 51) where you can click the "Create New" link to add one or more new contrasts.

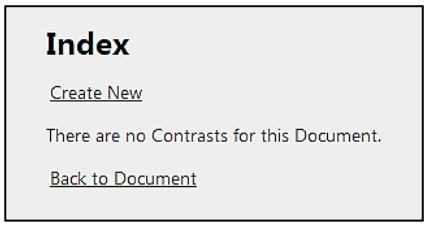


Figure 51. Contrast Index Page

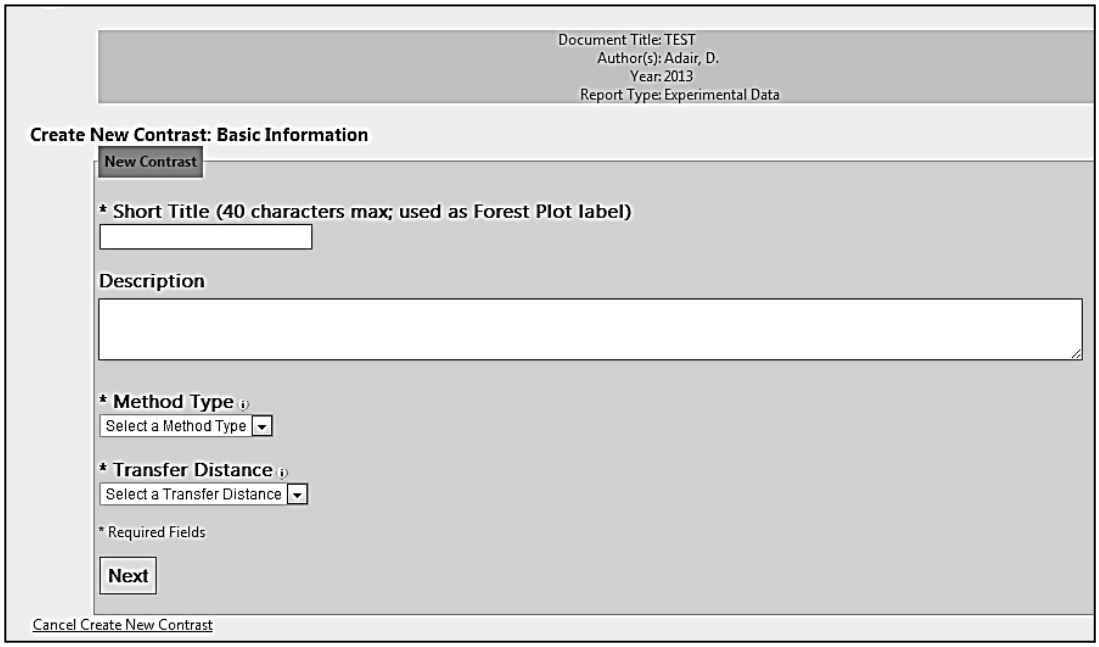


Figure 52. Create New Contrast: Basic Information

On the Create New Contrast: Basic Information page (Figure 52), the minimum information that must be entered to define a contrast includes:

- **Short Title** – A free text field designated for a brief description of the contrast (e.g., Jones et al. (2012), high experience, pure part training versus low experience, pure part training.)

- **Description (Optional)** – A free test field that is optionally available for entering a longer description of the study contrast procedures and/or data.

- **Method Type** – A drop-down menu where the user specifies the training method central to the treatment group in the contrast. In TARGET, a contrast is considered a comparison of treatment group versus control group, primarily defined for the purpose of creating an effect size estimate for the magnitude of the difference in transfer performance between the two groups. Method options include:
    - *Part task training*: Training method that decomposes complex tasks into a series of smaller tasks, each of which is demonstrated and practiced separately before being practiced as a whole task.
    - *Increasing difficulty*: Parameters of the whole task are initially set to lower levels, to reduce the intrinsic load during early training trials, and then increased as training progresses, until the difficulty reaches the level of the whole task. The difficulty levels can increase in either a fixed or adaptive schedule.
    - *Learner control*: An instructional method that provides trainees with decision-making control over specific dimensions or activities within a structured learning environment.
    - *Exploratory learning*: A trainee explores a task environment on his/her own. The level or type of guidance given to the trainee vary (i.e., only a user manual vs. conceptual input when trainer queried).
    - *Error Prevention*: An error prevention strategy geared towards reducing the complexity of the transfer task during initial learning for the purpose of reducing training task errors, and to help trainees acquire the appropriate schema to assimilate the transfer task throughout learning. Utilizes hard lockouts and worked examples.
    - *Scaffolding*: Assistive supports are provided to the trainee to ease the demands of independent task performance. The scaffold supports are incrementally faded out over time until the trainee is executing the whole task independently with minimal demand.

- **Transfer Distance** – A drop-down menu where the user specifies the transfer distance measure of the contrast. Available transfer distance options are: Identical tests, near transfer test, and far transfer tests.
    - Identical tests examine the application of what was learned in training using a task or problem identical to that used during training.
    - Near transfer tests examine the application of what was learned in training using a task or problem somewhat different, but similar, to that used during training.
    - Far transfer tests examine the application of what was learned in training using a testing situation that is different or new from the task or problem that was used in training

Once the basic contrast information has been entered click the "Next" button to save your entries. If you decide not to enter the new contrast click the "Cancel Create New Contrast" hyperlink at the bottom left of the page. Once contrasts have been defined, you may then enter specific moderator parameters.

Code the Study-Level Moderators Specific to Each Contrast

In addition to the basic information that must be added for a new contrast (i.e., description field, training method, and transfer distance), you may code the contrast for more specific information. This is the second step for adding a new contrast to the database. Here you provide moderator attribute coding to represent the experimental manipulations that define the specific control versus treatment contrast defined in the prior step. If you are adding a new contrast, once you select "Next" from the basic information page, TARGET will automatically add the new contrast and take you to the Create New Contrast: Moderators page (Figure 53). Moderators are selected with check boxes or drop-down lists.

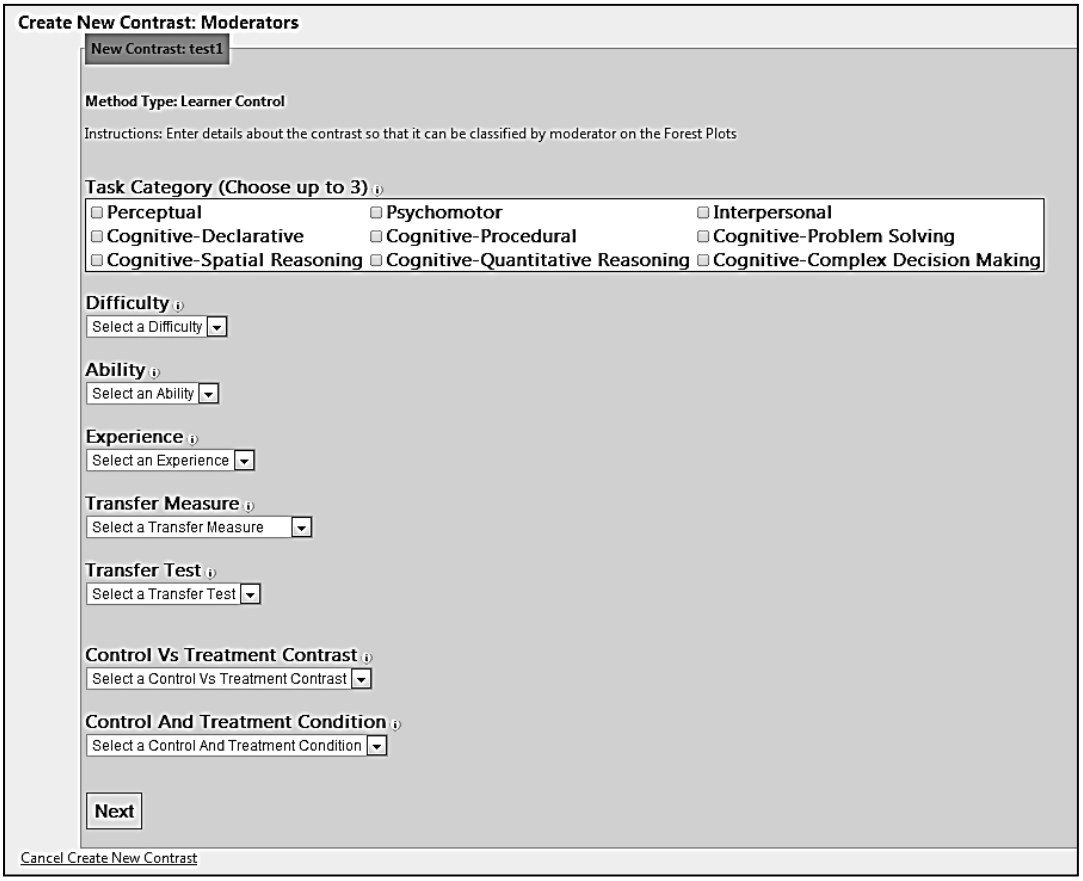


Figure 53. Create New Contrast: Moderators Page

The user may code the following moderator attributes prior to moving to the third step and entering data:

- **Task Category** – The skills that characterize the trained task. Users may check up to 3 different categories from among the following 9 options:
  - *Perceptual*: Skills involved in detecting and interpreting sensory information in order to gain awareness and support performance. The ability to detect and use sensory cues. Include some perceptual reasoning tasks.
  - *Psychomotor*: Physical skills - movement, coordination, manipulation, dexterity, strength, and speed; includes both fine motor skills and gross motor skills.
  - *Interpersonal*: Social interaction skills: communicate, exchange information, persuade, build and maintain relationships, manage conflict, and interact effectively.
  - *Cognitive-Declarative*: This category includes all verbal knowledge categories including facts, principles, knowledge organization, and verbal or graphical mental models, concept maps, etc.
  - *Cognitive-Procedural*: This category is meant to include performance of basic procedural skills, where the procedure may include cognitive steps and basic perceptual and motor steps such as those involved in navigating a computer interface. Constrained sequences of physical and cognitive activities performed in predictable situations.
  - *Cognitive-Problem Solving*: This category involves application of principles, rules and concepts to process information and solve problems. Includes general logical reasoning skills: inductive, deductive, diagnostic, etc.
  - *Cognitive-Spatial Reasoning*: Visual-spatial skills - skill in representing, transforming, generating, and recalling symbolic, nonlinguistic information. Includes: mental rotation; spatial perception - ability to determine spatial relationships with respect to own body orientation; spatial visualization - multi-step manipulations of spatially presented information, requiring analysis of the relationship between different spatial representations.
  - *Cognitive-Quantitative Reasoning*: Application of mathematical concepts and skills to solve problems.
  - *Cognitive-Complex Decision Making*: This category involves situation assessment and decision making in complex, dynamic and time-sensitive environments with changing situations, attentional demands, application of strategies, multiple goals, and may involve coordination of perceptual and motor skills.

- **Difficulty** – A general category of subjective task difficulty and objective task complexity; typically involves an experimental manipulation of task difficulty.
  - *Low*: An experimental condition where the authors manipulated task difficulty to be low; or the training task clearly has no interacting variables, making it not complex.

- *High*: An experimental condition where the authors manipulated task difficulty to be high; or the training task clearly has interacting variables, making it more complex.

- **Ability** – An individual difference variable assessing general or task-related ability, skill, or aptitude.
  - *Low*: Participants were assessed or tested as having low, often less than median, general or task-related ability, skill, or aptitude.
  - *High*: Participants were assessed or tested as having high, often greater than median, general or task-related ability, skill, or aptitude.

- **Experience** – An individual difference variable assessing prior knowledge, familiarity, or practice with the training content.
  - *Low*: Participants were assessed or screened through sampling as having little to no prior knowledge, familiarity, or practice with the content.
  - *High*: Participants were assessed, screened through sampling, or trained up to having moderate to significant prior knowledge, familiarity, or practice with the content.

- **Transfer Measure** – The type of outcome measure with regard to measurement of speed or accuracy – like performance.
  - *Accuracy/Quality*: Execution of appropriate action or response (e.g., steps, Multiple Choice / True or False /open ended answers, problems, recall, actions) measured as the percent correct, # correct, accumulated points, task/test scoring correct action/timing/performance but not rating, or general appropriateness of action/response. Also include quality rating by subject matter experts (SMEs) or inverse of error performance.
  - *Performance/Response time*: Time to respond or take appropriate action measured as time to complete the entire transfer task (i.e., time to complete), time to complete a subtask (i.e., time to respond), time to reach a criterion level of performance (i.e., time to criterion), or trials to reach a criterion level of performance (i.e., trials to criterion).

- **Transfer Test** – Characterizes the nature of the transfer test based on the focus of the assessment.
  - *Knowledge*: Knowledge tests capture the ability of a trainee to recall information or problem solve from a trained skill.
  - *Performance*: Performance tests capture the ability of a trainee to physically performance a trained skill.

Several method specific attributes are also available. These options are displayed at the bottom of the "Contrast Parameters" tab (Figure 53). Each method specific set of attributes is defined below.

Part Task Training

- Part task manipulation: The training treatment manipulation in which the whole task to be learned is somehow decomposed into subtasks and trained on those subtasks.
    - *Pure part*: All parts are trained individually before any integration into the whole or partially whole task.
    - *Cumulative part*: Cumulative-part training [Repetitive-part training] is where an individual part is practiced, then that first part and another part practiced, then those two with a third is practiced, and so forth (i.e., 1, then 1&2, then 1&2&3, then 1&2&3&4, … then whole task).
    - *Progressive part*: Progressive-part training is where each part is first practiced by itself, then combined with a progressively more integrated whole task (i.e., 1, then 2, then 1&2, then 3, then 1&2&3, then 4, then 1&2&3&4, … then whole task).
    - *Variable priority training*: VPT is where training occurs with the whole task but under conditions of particular emphasis of participant focus and performance is on specific subtasks of the whole task. Take as an example the skill of batting a ball in baseball. One approach would be to practice the skill of hitting a baseball by spending an hour each day practicing the entire swing and trying to hit the ball in the field. This would be consistent, or fixed priority (FP) training. Another approach would be to divide the hour into 15 minute segments with an emphasis on a different aspect of the swing (e.g. footwork, follow through, initial bat placement, and stance), all while still completing the entire stroke.
    - *Other*: Any less typical part task training manipulations with partial task practice versus a control condition of whole task practice.

- Concurrence: The degree that subtask "parts" are timeshared in the whole task.
    - *Segmentation*: Trained subtasks are clearly sequential parts (e.g., like learning the approach for landing an aircraft and then actually landing the aircraft, or learning the easier passage then the harder passage in a musical piece). An example of this is sometimes called backward chaining, forward chaining, or chaining.
    - *Fractionation - integrated*: Fractionation refers to the two (or more) trained sub-parts that are performed concurrently in the whole task (e.g., like training how to fly a plane by training vertical control and lateral control as two parts. A good pilot will time-share these two when doing a climbing turn). Another example: learning left hand and right hand on the piano, or strumming and chording on the guitar. Integrated means that within the whole task (now consisting of two time-shared parts), the parts interact with each other; that is, they are integrated tasks. An example of interaction is shifting gears versus using the clutch. Although each may be practiced separately, when actually changing gears, the timing of the two components needs to be exquisitely integrated.

- *Fractionation - separated*: For explanation of Fractionation, see previous paragraph. Separated means that within the whole task (now consisting of two time-shared parts), the parts do not interact with each other; that is, they are separate tasks. An example of separated is talking on the cell phone while driving. Although these two may interfere with each other via human attention limitations, within the system, what is said on the phone has no influence in how the car responds.

Increasing Difficulty

- Control – Treatment contrast: The comparative training treatment manipulation of increasing difficulty conditions.
  - *Constant Difficulty vs. Adaptive Steps*: Control is learner independent and at a constant level of difficulty versus a Treatment of any of learner dependent adaptive conditions. Under constant difficulty all learners receive the same schedule of fixed step increases. Under adaptive steps, difficulty increases for each learner are done on the basis of his or her trial by trial performance.
  - *Constant Difficulty vs. Fixed Steps*: Control is learner independent and at a constant level of difficulty versus Treatment is learner independent, increasing steps in difficulty are on a fixed schedule of increasing difficulty.
  - *Fixed Steps vs. Adaptive Steps*: Control is learner independent using fixed steps versus a Treatment of any of learner dependent adaptive conditions.

- Contrast detail: Further description of the specific instance of adaptive training used in the contrast.
  - *Constant vs. Adaptive: Performance*: Control is learner independent and at a constant level of difficulty versus Treatment is learner dependent - difficulty steps adapted based on participant's individual or groups' performance or progress on the training task.
  - *Constant vs. Adaptive: Initial Differences*: Control is learner independent and at a constant level of difficulty versus Treatment is learner dependent - pretesting to determine initial ability and then “adaptively” assigned to a starting difficulty level based on pretest performance.
  - *Constant vs. Fixed Steps*: Control is learner independent and at a constant level of difficulty versus Treatment is learner independent, increasing steps in difficulty are on a fixed schedule of increasing difficulty.
  - *Fixed Steps vs. Adaptive: Performance*: Control is learner independent, increasing steps in difficulty are on a fixed schedule of increasing difficulty versus Treatment is learner dependent - difficulty steps adapted based on participant's individual or groups' performance or progress on the training task.
  - *Fixed Steps vs. Adaptive: Initial Differences*: Control is learner independent, increasing steps in difficulty are on a fixed schedule of increasing difficulty versus Treatment is learner dependent - pretesting to determine initial ability and then “adaptively” assigned to a starting difficulty level based on pretest performance.

- *Other*: General category for all other adaptive treatments. Three example adaptive training treatments included under the "other" option include:
  - *Self adaptive*: Treatment is learner dependent - difficulty steps adapted by participant at participant's discretion.
  - *Performance maintenance*: Treatment is learner dependent - performance or error rates are monitored and difficulty is adjusted up or down to maintain a desired level of performance that is typically staggered in increasingly difficulty blocks of trials.
  - *Adaptive down*: The initial treatment is learning independent, but subsequent trials are learner dependent. The trainee begins with a high-difficulty trial and the presentation of subsequent training trials depends on their performance. If they perform poorly, they move to a less difficult trial. If they perform well, they move to a more difficult trial (or stay at the same level of difficulty if they are already at the high difficulty level).

- Adaptive training adjustments: The timing constraint by which training difficulty is adaptively adjusted more or less.
  - *Continuous adjustments*: Difficulty is continuously modified by real time performance monitoring and adjustments.
  - *Incremental adjustments by trial*: Difficulty is adjusted incrementally (i.e., from training trial to trial) based on previous trial's performance.
  - *Incremental adjustments by block*: Difficulty is adjusted incrementally (i.e., from one block of trials to the next) based on previous block's performance.

Learner Control

- Control – Treatment contrast: The comparative training treatment manipulation of no (or less) learner control versus learner control.
  - *Programmatic vs. Full learner control*: Control is programmatic (i.e., zero learner control) versus Treatment is 100% learner control over all training dimensions.
  - *Programmatic vs. Partial learner control*: Control is programmatic versus Treatment only provides the learner with control over one or a subset of training dimensions.
  - *Partial learner control vs. Full learner control*: Control only provides the learner with control over one or a subset of training dimensions versus Treatment is 100% learner control over all training dimensions.
  - *Partial min vs. Partial max*: Control only provides the learner with control over one training dimension versus Treatment provides the learner with control over a larger range of training dimensions.

- Partial learner control dimensions: The specific dimensions of learner control that trainees had control over.
  - *Pace*: Learner control over speed/pace through a fixed set of content or material. All content has to be viewed, but time to progress through content is

under learner control through either unlimited progression time or choice to repeat content modules before progressing.

- *Branching*: Learner control over path/sequence through a fixed set of content or material. All content has to be viewed, but choice over order is under learner control.
- *Truncation of lessons*: Learner control over stopping point in training material, regardless of exhaustiveness. Specific to the number of content or lesson "views," so leaner control is over choice to view a subset of available content lessons (i.e., skipping lessons 1 and 2 out of 10 lessons).
- *Truncation of feedback/practice*: Learner control over practicing content, taking quizzes, receiving feedback on performance, or viewing interactive materials in an additional "view." Specific to the learner's choice over an additional "view" that is not lesson-oriented but an additional feedback or learning mechanism.
- *Multiple*: Any combination of the above dimensions of learner control.
- *Other*: General category for all other dimensions of learner control (e.g., learner control over training difficulty).

Exploratory Learning

- Level of Guidance vs. Exploration: The degree of learning guidance provided to learners versus the degree of self exploration of the training content. The treatment condition is the condition that maximizes support for exploration and minimizes learning content guidance.
  - *Minimal Guidance vs. Maximum Exploration*: Control is minimal instruction (orientation, learning goals, objectives, problem description), pretest problem scenarios; trial specific learning objectives or tasks to perform during exploration/discovery; very minimal solicited only guidance during exploration/practice, more conceptual or meta-cognitive than content specific; unsolicited guidance only when needed to recover from error; Knowledge of results but no corrective feedback versus Treatment is unstructured and unguided exploration; example only for rule discovery.
  - *Guided vs. Maximum Exploration*: Control is instruction that provides demonstration, worked example, conceptual framework, solution strategy but not in a detailed step by step approach; predefined well-structured problems; access to worked examples; unsolicited prompts (instructor or computer based) that provide content advice or direction or prevent errors; limited corrective guidance during delayed (after a trial) feedback versus Treatment is unstructured and unguided exploration; example only for rule discovery.
  - *Guided vs. Minimal Guidance*: See above for Guided Control definition. Treatment is minimal instruction (orientation, learning goals, objectives, problem description), pretest problem scenarios; trial specific learning objectives or tasks to perform during exploration/discovery; very minimal solicited only guidance during exploration/practice, more conceptual or meta-cognitive than content specific; unsolicited guidance only when needed to recover from error; Knowledge of results but no corrective feedback.

- *Directed vs. Maximum Exploration*: Control is detailed step by step instructions, demonstration, worked example or solution path; explicit descriptions of procedure or rule, prior to or during practice (or after exploration but prior to transfer testing); immediate corrective feedback versus Treatment is unstructured and unguided exploration; example only for rule discovery.
- *Directed vs. Minimal Guidance*: See above for Directed Control description. Treatment is minimal instruction (orientation, learning goals, objectives, problem description), pretest problem scenarios; trial specific learning objectives or tasks to perform during exploration/discovery; very minimal solicited only guidance during exploration/practice, more conceptual or meta-cognitive than content specific; unsolicited guidance only when needed to recover from error; Knowledge of results but no corrective feedback.
- *Directed vs. Guided Exploration*: See above for Directed Control description. Treatment is instruction that provides demonstration, worked example, conceptual framework, solution strategy but not in a detailed step by step approach; predefined well-structured problems; access to worked examples; unsolicited prompts (instructor or computer based) that provide content advice or direction or prevent errors; limited corrective guidance during delayed (after a trial) feedback.

- Error encouragement: Whether learners are encouraged to make, and learn from, errors or mistakes made during training.
  - *More exploration group only*: The treatment group with greater autonomy to explore is the only group encouraged to make errors during training.
  - *No or less exploration group only*: The control group with greater training guidance is the only group encouraged to make errors during training.
  - *Neither*: Neither treatment nor control groups are encouraged to make errors during training.
  - *Both*: Both treatment and control groups are encouraged to make errors during training.

Error Prevention

- Type of training wheels: The type of error preventive mechanism used in the training treatment.
  - *Lockouts*: Irrelevant features locked out, or made unavailable, to prevent common errors.
  - *Worked examples*: Worked out examples of the training problems are presented with no additional guidance or information.
  - *Worked examples with prompts*: When the worked out example is presented, it includes prompts, cues, or elaborations relevant to the correct process/problem solution.

- Treatment timing:

- *Instruction*: The lockout or worked example is only imposed/available during instruction, prior to practice. Instruction starts with unsolved problem and then fully worked out example presented with all steps shown at once, not available when participant practices solving the problem.
- *Practice*: The lockout or worked example is imposed/available for the student to reference whenever they want to during practice, either as an optional view or simply the first few out of a several problems solved.
- *Instruction & Practice*: The lockout or worked example is imposed/available both during instruction and practice.

Scaffolding

- Scaffolding Prompt Type: The type of error preventive prompt used in the training treatment.
  - *Critical thinking about the concept*: Prompts emphasizing key concepts and relationships critical to learning the training content.
  - *Self-regulation of learning*: Prompts emphasizing that participants monitor their emerging understanding and plan/engage their learning experience.
  - *Strategy based prompts*: Prompts emphasizing underlying principles, rules, and processes required to solve the problem.
  - *Other*: A general category for all other types of prompts.

- Scaffolding Administration: Manipulations involving the removal schedules of the error preventative mechanism.
  - *Fixed*: Scaffolding support removed or added on a fixed schedule independent of the participant's performance in the training.
  - *Adaptive*: Scaffolding support removed or added adaptively based on participant performance in the training.
- Scaffolding Delivery: The mode of delivery of the scaffolding support.
  - *Human Tutor*: The error preventative scaffold was delivered to the trainee via a human tutor.
  - *Handout*: The error preventative scaffold was delivered to the trainee via a handout.
  - *Computer/web*: The error preventative scaffold was delivered to the trainee electronically over the computer.

By clicking the “Next” button the attribute data is saved in the database and the user can advance to the third step for defining a contrast for effect size calculations. If you decide not to enter the contrast moderator data click the “Cancel Create New Contrast” hyperlink at the bottom left of the page.

Define Contrast Statistics

The third step in adding a contrast for effect size calculations is selecting the type of data that you will enter for the effect size calculation. Here, you select the type of statistics you have available for data entry. You first select the type of data available from: descriptive statistics, t-test results, or F-test results by clicking the appropriate radio button (Figure 54). Once you select one of the radio buttons, TARGET will display additional options based on the selection.

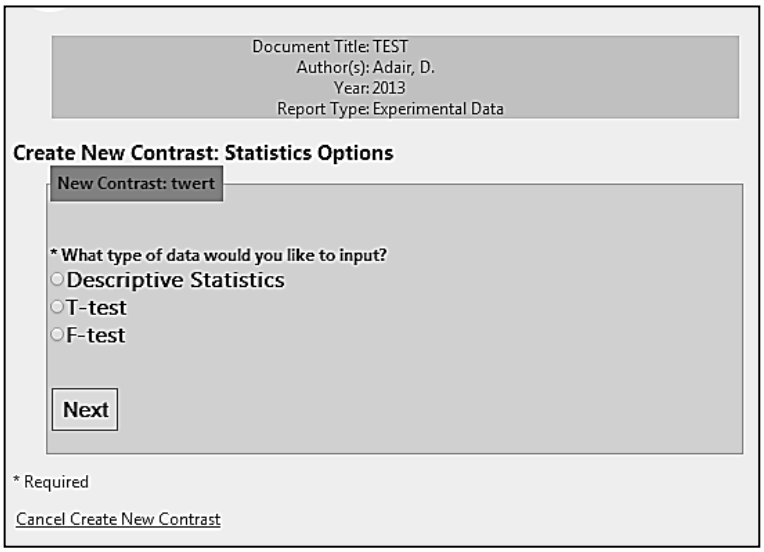


Figure 54. Create New Contrast: Statistics Options

Descriptive Statistics

Descriptive statistics are summary statistics about the sample and measures. Examples of descriptive statistics are the mean, standard deviation, and sample size. If you have descriptive statistics, one of the following four combinations of descriptive statistics must be selected using the radio buttons on the page (Figure 55):

- Treatment mean (M_t), Treatment standard deviation (SD_t), Treatment sample size (n_t), Control mean (M_c), Control standard deviation (SD_c), and the Control sample size (n_c).
- Treatment mean (M_t), Treatment standard deviation (SD_t), Control mean (M_c), Control standard deviation (SD_c), and the Overall sample size (N), when $n_t = n_c$.
- Treatment mean (M_t), Treatment sample size (n_t), Control mean (M_c), the Control sample size (n_c), and the Pooled standard deviation (SD_{pooled}).
- Treatment mean (M_t), Control mean (M_c), the Pooled standard deviation (SD_{pooled}), and the Overall sample size (N), when $n_t = n_c$.

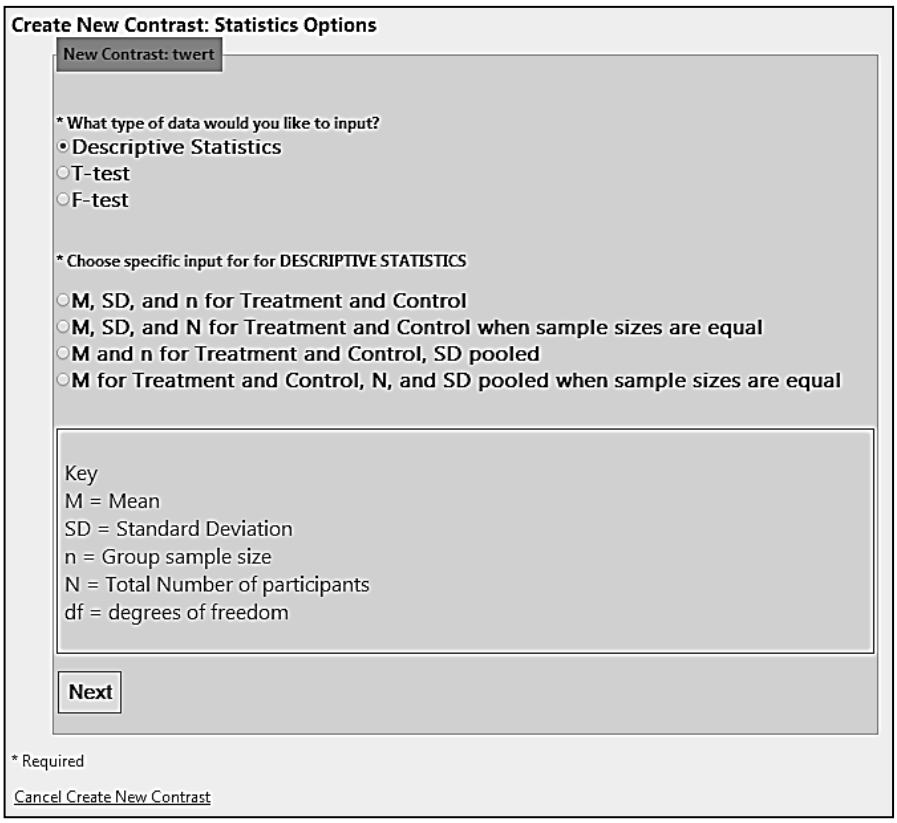


Figure 55. Descriptive Statistics Options

T-Test Results

T-tests are a class of inferential statistical tests, specifically, the Student's t-test for small samples. Examples of t-test output are the t value, the p value, the degrees of freedom, and sample size. If you have t-test results, one of the following six combinations of t-test output statistics must be selected using the radio buttons on the page (Figure 56):

- t value, Treatment sample size (n_t), and the Control sample size (n_c).
- t value and degrees of freedom (df), when $n_t = n_c$.
    - For this option, the sample must be defined as independent samples or dependent samples when entering data in the next window. Dependent samples compare performance for the *same* sample of participants in both training conditions. Independent samples compare performance of *different* samples of participants, one for each condition.
- t value and the Overall sample size (N), when $n_t = n_c$.
- p value of t-test, Treatment sample size (n_t), and the Control sample size (n_c).
    - For this option, the sample must be defined as independent samples or dependent samples when entering data in the next window (see above for the distinction).
- p value of t-test and degrees of freedom (df), when $n_t = n_c$.
    - For this option, the sample must be defined as independent samples or dependent samples when entering data in the next window (see above for the distinction).

- p value of t-test and the Overall sample size (N), when $n_t = n_c$.
    - For this option, the sample must be defined as independent samples or dependent samples when entering data in the next window (see above for the distinction).

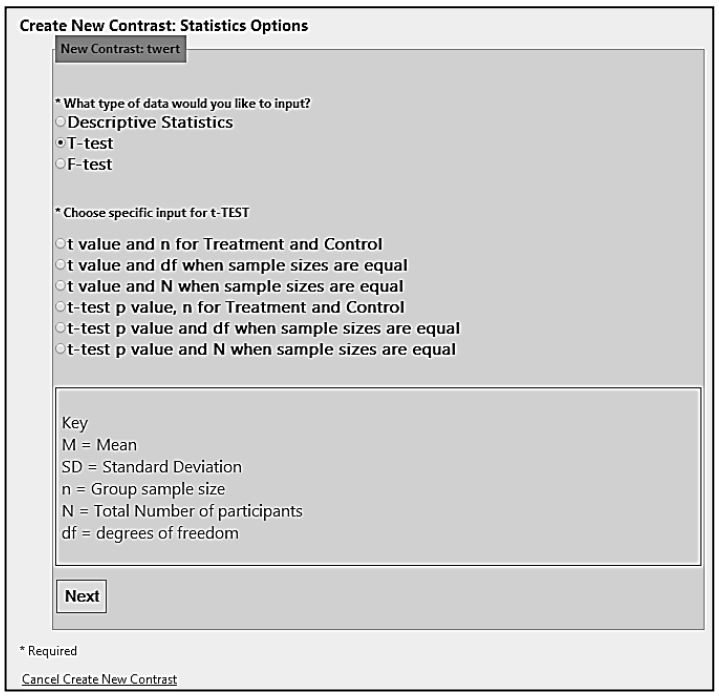


Figure 56. t-Test Statistics Options

F-Test Results

F-tests are a class of inferential statistical tests, often run in association with analysis of variance. Examples of F-test output are the F value, the p value, the degrees of freedom numerator, the degrees of freedom denominator, and sample size. If you have F-test results, one of the following six combinations of F-test output statistics must be selected using the radio buttons on the page (Figure 57):

- F value, Treatment sample size (n_t), and the Control sample size (n_c).
- F value and degrees of freedom (df), when $n_t = n_c$.
    - For this option, the sample must be defined as independent samples or dependent samples when entering data in the next window (see t-test results section above for the distinction).
- F value and the Overall sample size (N), when $n_t = n_c$.
- p value of F-test, Treatment sample size (n_t), and the Control sample size (n_c).
    - For this option, the sample must be defined as independent samples or dependent samples when entering data in the next window (see above for the distinction).

- p value of F-test and degrees of freedom (df), when $n_t = n_c$.
    - For this option, the sample must be defined as independent samples or dependent samples when entering data in the next window (see above for the distinction).
- p value of F-test and the Overall sample size (N), when $n_t = n_c$.
    - For this option, the sample must be defined as independent samples or dependent samples when entering data in the next window (see above for the distinction).

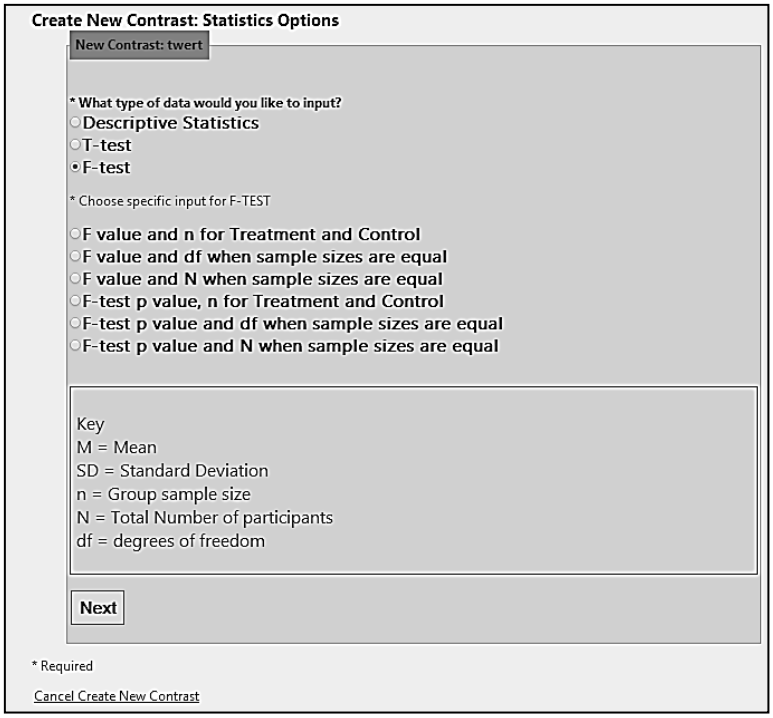


Figure 57. F-Test Statistics Options

By clicking the "Next" button you will be taken to another window where you can enter your data for effect size computation. Entering user data is the last step in entering contrast information for the effect size calculation.

Data Entry and Computing the Effect Size

The fourth and final step in entering contrast information for the effect size calculation is data entry. Here, a number of fields are available to you that are specific to the data type information defined in the previous step. An example of the data entry fields for a set of descriptive statistics is shown in Figure 58, for a set of t-test results in Figure 59, and for a set of F-test results in Figure 60.

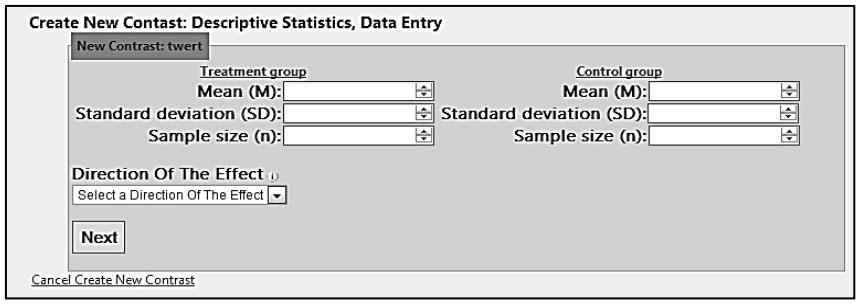


Figure 58. Example Descriptive Statistics Entry

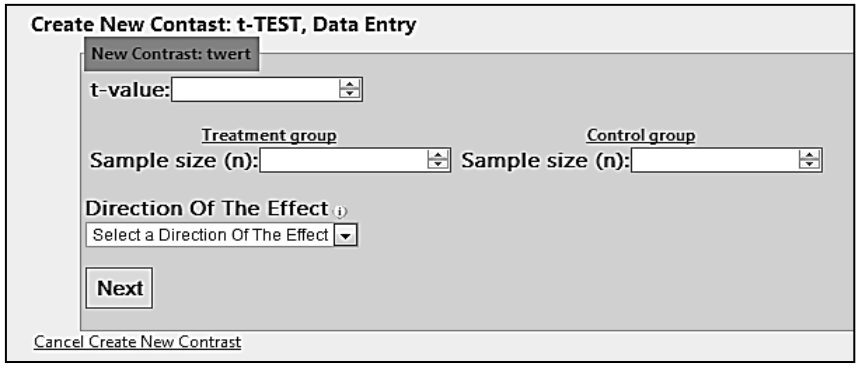


Figure 59. Example t-Test Data Entry

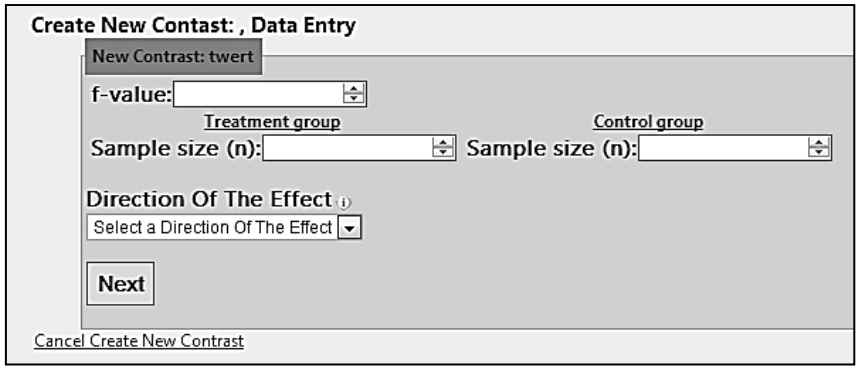


Figure 60. Example F-Test Data Entry

The last piece of information you must provide before computing the effect size is the direction of effect. The direction of effect is indicated with a drop-down as shown in the figures above.

- Effect size describes the magnitude of the difference between the treatment training condition and control condition; however, it also describes the direction of the effect.
- A difference is in the *positive* direction if the treatment (e.g., high learner control training group) shows a training improvement over the control group (e.g., no learner control group).
- A difference is in the *negative* direction if participants in the treatment group perform worse on average due to the training than participants in the control group.
- If both treatment and control groups were *exactly the same*, then the difference, and therefore effect size, would be zero (neither positive or negative in direction).

Once all data has been entered and the direction of effect has been specified, select the "Next" button and a set of effect size statistics is presented for the selected contrast at the bottom of the window (Figure 61). The top of the window show the statistics parameters entered.

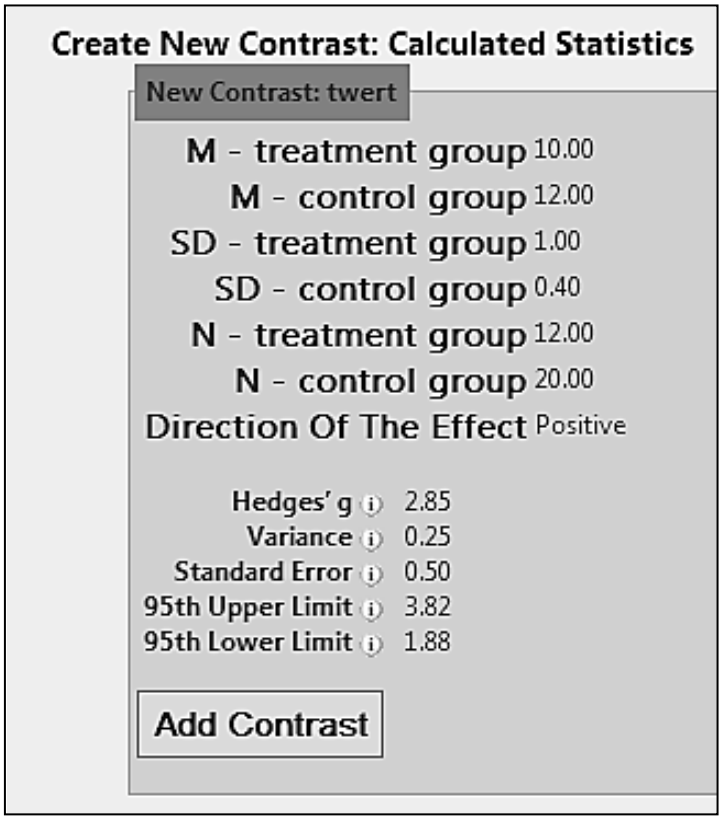


Figure 61. Calculated Statistics Example

Once the effect size statistics have been computed, you need to click on the “Add Contrast” button. TARGET will save all the contrast parameters to the database. If the contrast has been successfully added, TARGET will display a page showing that the contrast was created successfully (Figure 62).

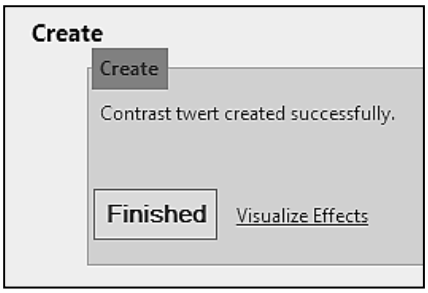


Figure 62. Contrast Created Successfully

From here, you can either click the “Finished” button to go back to the contrast index page or you may link to the forest plots under Explore Methods for the training method coded under the current contrast. To link to a forest plot for the training method of the new contrast, click to the “Visualize Effects” button at the bottom of the window. TARGET will take you to the Explore Methods page and display the forest plat data for the training method selected. The “Include New Studies” checkbox under “Advanced Options” will be automatically checked so that the effects from the newly entered contrast are used in the effect size calculations.

Authors Submenu

Selecting the “Authors” submenu under the “Documents” menu will open the Authors Index page (Figure 63). From here, you can view/edit the list of all the authors in the current database and view a list of documents for any selected author.

Figure 63. Author Index

You can select any of the options “Edit,” “Details,” or “Delete” to the right of each author name. As a contributor you can only edit or delete authors that you added. The “Edit” option will open the Edit page (Figure 64) where you can view/edit the author’s first and last name. If you make any changes, click on the “Save” button to commit your changes.

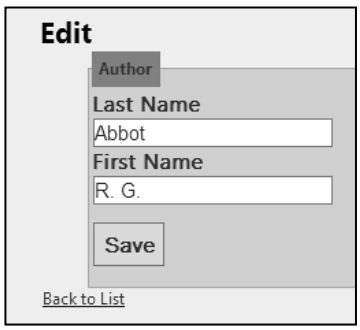


Figure 64. Edit Author Page

The “Details” option will show you the author information and a list of documents associated with that author (Figure 65).

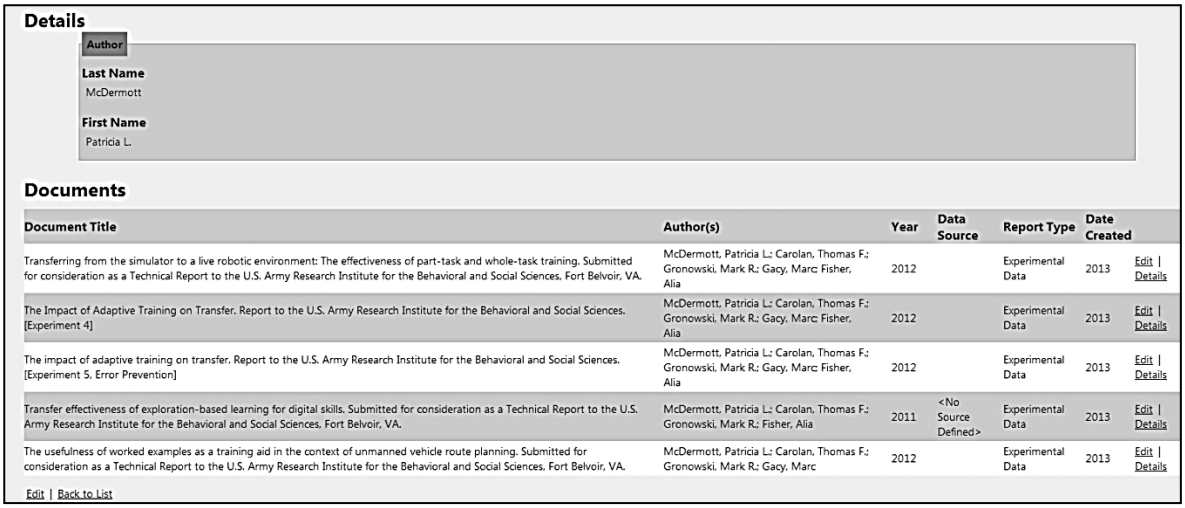


Figure 65. Author Details Page

The “Delete” option will cause TARGET to delete that author from the database.

Data Sources Submenu

Selecting the “Data Source” submenu under the “Documents” menu will open the Data Source Index page (Figure 66). From here, you can view/edit the list of all the data sources in the current database.

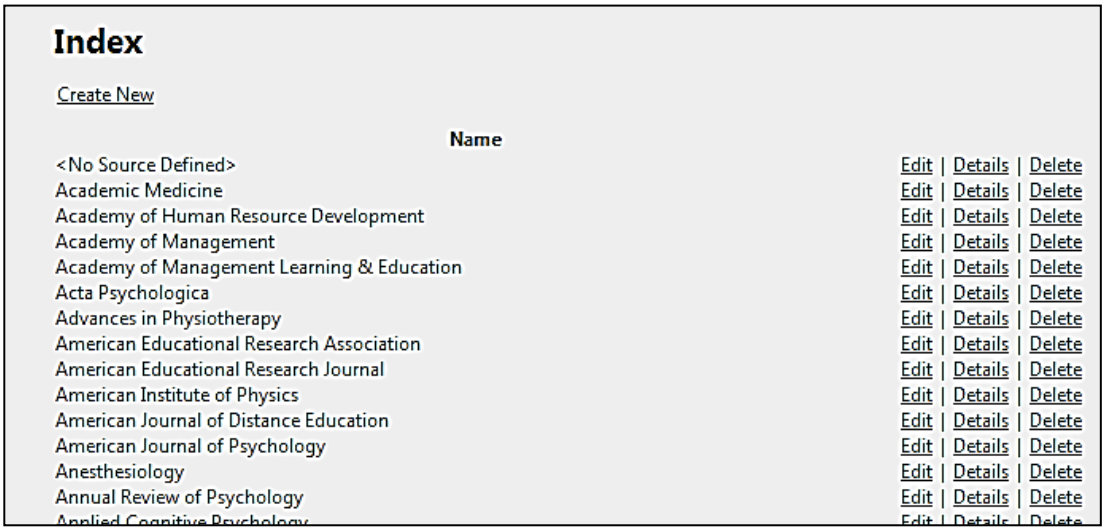


Figure 66. Data Source Index Page

You can select any of the options “Edit,” “Details,” or “Delete” to the right of each data source name. As a contributor you can only edit or delete data sources that you added. The “Edit” option will open the Edit page where you can view/edit the name of the data source. If you make any changes, click on the “Save” button to commit your changes.

The “Details” option will show you the data source information and the “Delete” option will remove the data source from the database.

Help Menu

View Training Method Definitions

The view Training Method Definitions function allows users to view extended descriptions of different training methods, such as Part-Task training. To view a training method definition, select "Definitions" from the "Help" menu located at the top of the Explore Documents window (Figure 67).

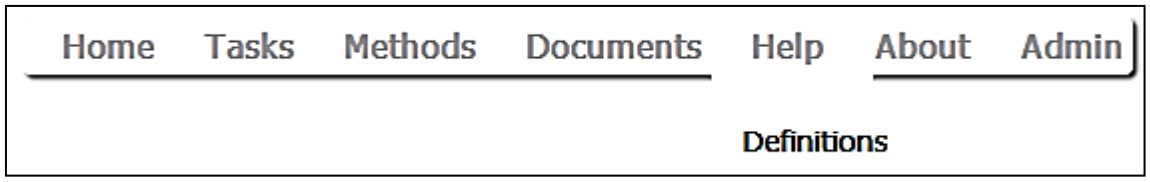


Figure 67. Definitions Submenu

Once selected, a range of training method options will be displayed in a drop-down list. Selecting a method will open a description and summary of the selected training method (Figure 68).

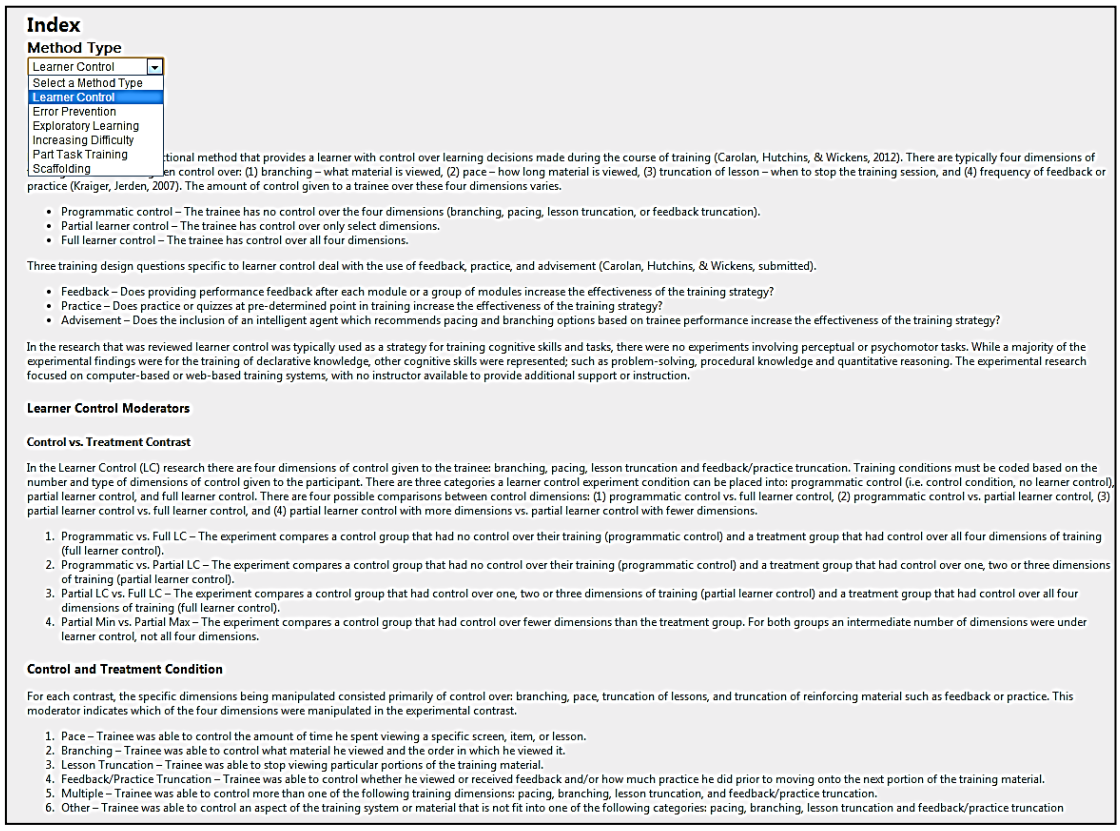


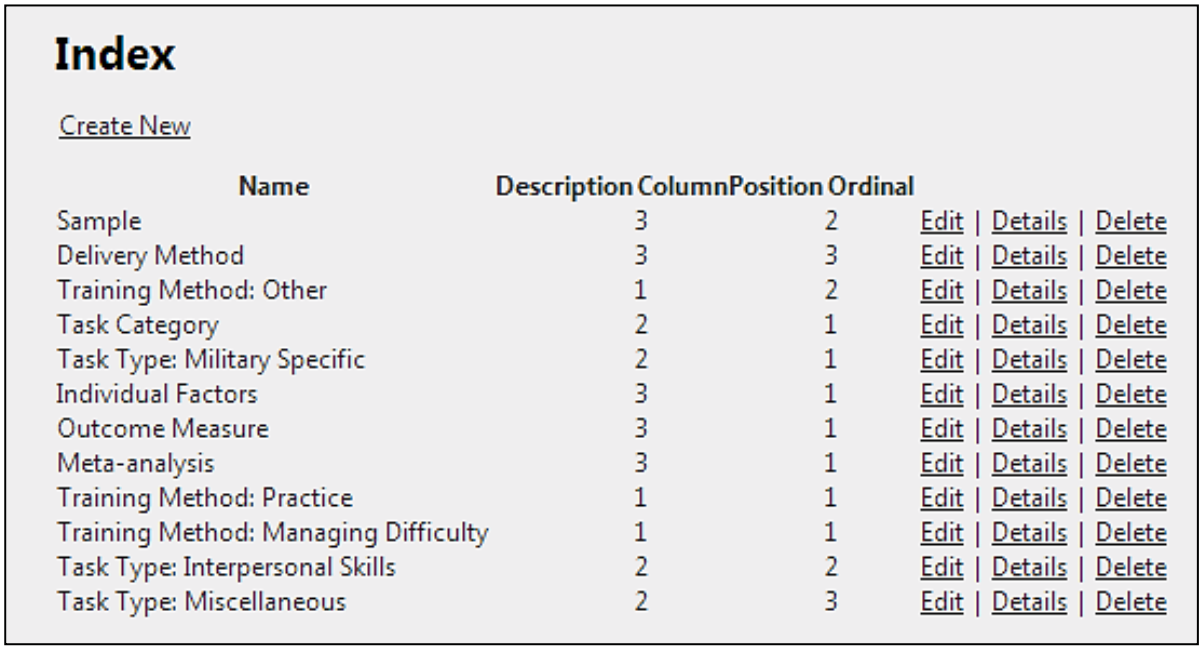
Figure 68. Definitions Page

Admin Menu

The Admin menu option is only visible to users with Administrator privileges. The Admin menu offers three submenu choices: Categories, Attributes, or Document Summary MetaData. Each of these are described in this section

Admin Categories Menu

Selecting the "Categories" option under the "Admin" menu will display a window similar to Figure 69. This page allows you to view/edit the categories that are displayed on the Document attributes page.



Index

Create New

Name	Description	ColumnPosition	Ordinal	
Sample	3	2		Edit | Details | Delete
Delivery Method	3	3		Edit | Details | Delete
Training Method: Other	1	2		Edit | Details | Delete
Task Category	2	1		Edit | Details | Delete
Task Type: Military Specific	2	1		Edit | Details | Delete
Individual Factors	3	1		Edit | Details | Delete
Outcome Measure	3	1		Edit | Details | Delete
Meta-analysis	3	1		Edit | Details | Delete
Training Method: Practice	1	1		Edit | Details | Delete
Training Method: Managing Difficulty	1	1		Edit | Details | Delete
Task Type: Interpersonal Skills	2	2		Edit | Details | Delete
Task Type: Miscellaneous	2	3		Edit | Details | Delete

Figure 69. Admin Categories Page

You can select any of the options “Edit,” “Details,” or “Delete” to the right of each category. The “Edit” option will open the Edit page (Figure 70) where you can view/edit the category name, description, column position and/or ordinal value. If you make any changes, click on the “Save” button to commit your changes.

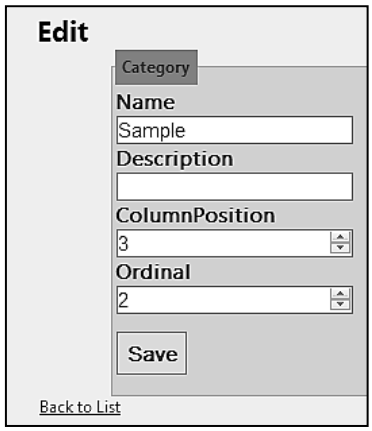


Figure 70. Edit Categories Window

The “Details” option will show you the category information but you cannot edit it.

The “Delete” option will cause TARGET to delete that category. All attributes defined under that category will also be deleted.

Admin Attributes Menu

Selection of the “Attributes” option under the “Admin” menu displays the Attributes Index page (Figure 71). From here you can view/edit the attributes that are displayed under each category on the Document attributes page.

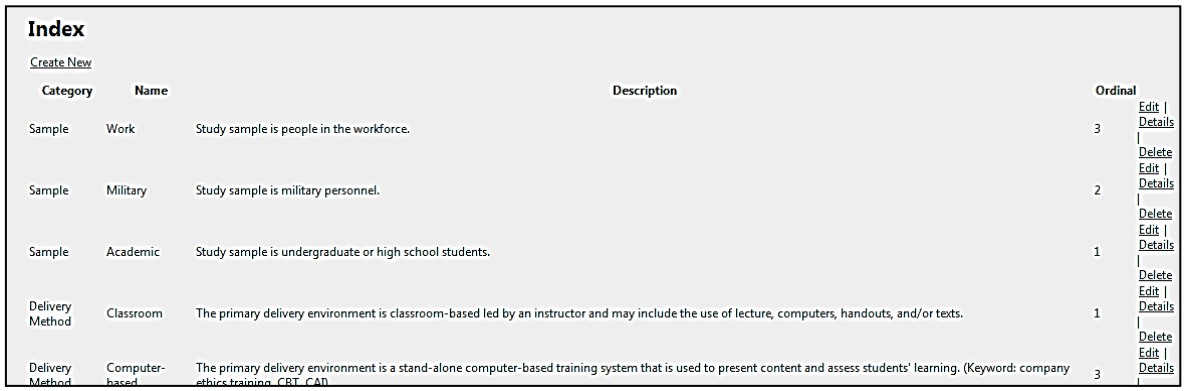


Figure 71. Admin Attributes Index Page

You can select any of the options “Edit,” “Details,” or “Delete” to the right of each attribute. The “Edit” option will open the Edit page (Figure 72) where you can view/edit the category the attribute belongs to, attribute name, description, and/or ordinal value. If you make any changes, click on the “Save” button to commit your changes.

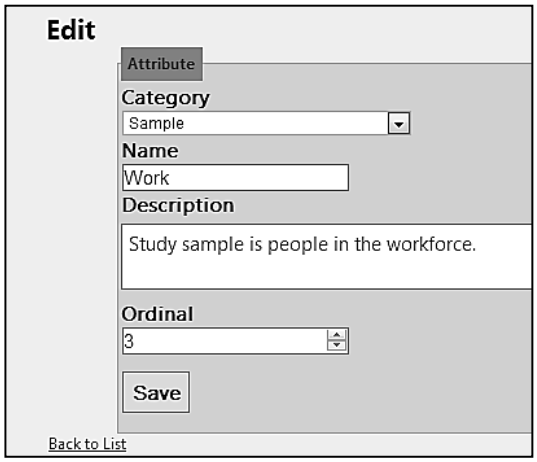


Figure 72. Attributes Edit Page

The “Details” option will show you the attribute information but you cannot edit it.

The “Delete” option will cause TARGET to delete that attribute.

Admin Document Summary MetaData Menu

The “Document Summary MetaData” option allows you to view/edit the document fields and field definitions that appear on the Document Summary page. If you select the “Document Summary MetaData” submenu under the “Admin” menu, TARGET will display the MetaData Index page (Figure 73). From here you can view/edit the data fields and definitions that are displayed on the Document Summary page.

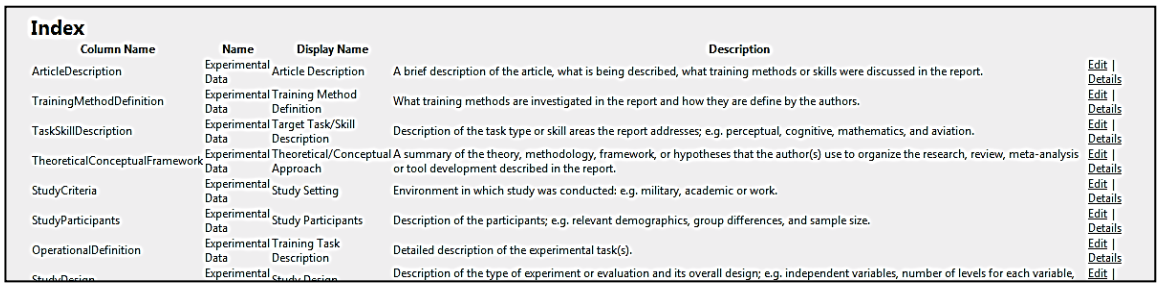


Figure 73. Admin Document MetaData Page

You can select “Edit” or “Details” to the right of each attribute. The “Edit” option will open the Edit page (Figure 74) where you can view/edit the Report Type, display name, and/or description. If you make any changes, click on the “Save” button to commit your changes.

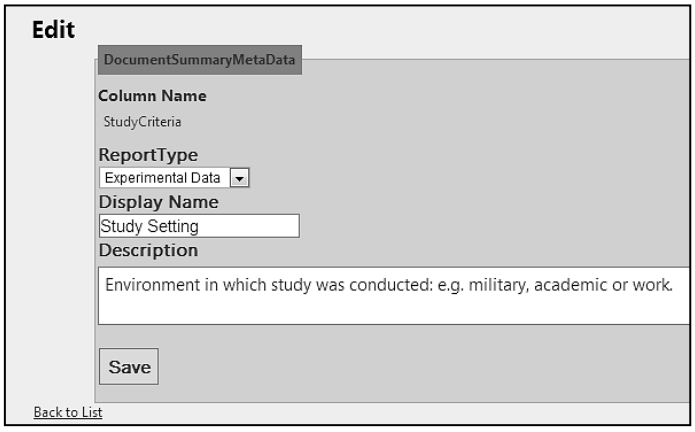


Figure 74. Edit MetaData Page

The “Details” option will show you the metadata information but you cannot edit it.

Troubleshooting

This section details known issues and presents solutions.

1. **"On the Explore Task page I cannot see the bubble-chart. Only a blank square is shown on the page."**
    a. If you are using Internet Explorer make sure that compatibility mode is off. To check if compatibility mode is on/off click on the Tools menu. If there is a checkmark next to "Compatibility View" then it is on. To turn it off click on the "Compatibility View" menu item. If you are using Internet Explorer 10 you will need to go to "Compatibility View Settings" and uncheck all settings.

2. **"On the Explore Methods page I cannot see the forest plot. Only a blank square is shown on the page."**
    a. If you are using Internet Explorer make sure that compatibility mode is off. To check if compatibility mode is on/off click on the Tools menu. If there is a checkmark next to "Compatibility View" then it is on. To turn it off click on the "Compatibility View" menu item. If you are using Internet Explorer 10 you will need to go to "Compatibility View Settings" and uncheck all settings.

3. **"I get sent to an unauthorized page."**
    a. Contributor level users (default) cannot delete or edit any documents, authors, or data sources that they did not create. Attempting to edit or delete the TARGET library data will result in the unauthorized page being shown.

4. **"Server Error in '/Target' Application message**
    a. If you see this message it means that your session has timed out. Go back to the login page at http://bldr-webtest.alionscience.com/Target/ and re-login to the site.

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Appendix A – Attribute Definitions

Category	Attribute Name	Attribute Definition
Training Strategy: Practice	Group Practice	Practice in pairs or small groups. Trainees can be either co-located, working on a task face-to-face, or distributed, working together electronically. (Keywords: group discussion, small group projects)
Training Strategy: Practice	Mental Practice	Mentally rehearsing the steps in a task. (Keywords: symbolic mental rehearsal, visualization exercises)
Training Strategy: Practice	Overlearning	Intentionally continuing practice on a task after the trainee initially reaches the skill level required to be considered proficient at the task. (Keywords: degree of overlearning, repeated practice)
Training Strategy: Practice	Practice Spacing	Time interval between repetitions of practice trials; either no time (massed) or some predetermined interval (spaced). (Keywords: spaced practice, massed practice)
Training Strategy: Practice	Scenario-Based Practice	Scenario-based practice, which is learner-centric and requires the trainee to learn by doing. Trainee encounters cues and decisions similar to those he would be expected to deal with in a real mission or on-the-job. Usually in a synthetic learning environment. (Keywords: theme-based, goal-based scenarios)
Training Strategy: Managing Difficulty	Adaptive Training	Task difficulty is automatically varied, or adapted, dependent upon trainee performance in order to maintain a constant level of performance (i.e., effort demand) as trainee learning of a task proceeds. (Keywords: intelligent tutoring, adaptive remediation)

Category	Attribute Name	Attribute Definition
Training Strategy: Managing Difficulty	Exploration	A trainee explores a task environment on his own. The level or type of guidance given to the trainee vary (i.e., only a user manual vs. conceptual input when trainer queried). (Keywords: discovery learning, error management training)
Training Strategy: Managing Difficulty	Increasing Difficulty	Parameters of the target whole task are initially set to lower levels, to reduce the intrinsic load during early training trials, and then increased as training progresses, until the difficulty reaches the level of the target task. The difficulty levels can increase in either a fixed or adaptive schedule. (Keywords: part-to-whole training, simplification)
Training Strategy: Managing Difficulty	Learner Control	An instructional method that provides trainees with decision making control over specific dimensions or activities within a structured learning environment. (Keywords: pace control, open access)
Training Strategy: Managing Difficulty	Part Task Training	Training method that decomposes complex tasks into a series of smaller tasks, each of which is demonstrated and practiced separately before being practiced as a whole task. (Keywords: segmentation, simple-to-complex)
Training Strategy: Managing Difficulty	Scaffolding	Assistive supports are provided to the trainee to ease the demands of independent task performance. The scaffold supports are incrementally faded out over time until the trainee is executing the whole task independently with minimal demand. (Keywords: prompts, fading)

Category	Attribute Name	Attribute Definition
Training Strategy: Managing Difficulty	Training Wheels/Error Prevention	An error prevention strategy geared towards reducing the complexity of the transfer task during initial learning for the purpose of reducing training task errors, and to help trainees acquire the appropriate schema to assimilate the transfer task throughout learning. (Keywords: prompts, lockouts)
Training Strategy: Managing Difficulty	Variable Priority Training	Training in which different components of whole task are systematically emphasized or deemphasized to allow more attention to be focused on the former while still preserving the necessary element of time sharing. (Keywords: changing priority, integrated approach)
Training Strategy: Managing Difficulty	Worked Examples	Training resembling training wheels and scaffolding, but differs in how much of the target task is initially facilitated for the trainee. In training problem solving, problems early in the learning sequence have some, or even all of the steps carried out for the learner. (Keywords: solution only, decreasing support)
Training Strategy: Other	Behavior Modeling	Observing and reproducing a sequence of new behaviors. Trainee learns by watching another person engage in a sequence of behaviors. (Keywords: guided demonstration, role-playing.)
Training Strategy: Other	Feedback	Providing information to trainees about their progress in order to reduce the gap between current and desired performance. The guidance can target either outcome-related performance (knowledge of results) or the process of task performance (knowledge of performance). (Keywords: directive feedback, formative feedback)

Category	Attribute Name	Attribute Definition
Training Strategy: Other	Goal Based	Trainee is required to set a specific and attainable goal prior to training. (Keywords: goal setting, goal attainment)
Training Strategy: Other	Prior knowledge activation	Using a trainees pre-existing knowledge to help with the acquisition of new knowledge. Trainers relate new material to material already known by trainees. (Keywords: engaging prior knowledge, contrasting cases)
Training Strategy: Other	Problem Based Learning	A learner-centric training method that involves trainees working together in small groups to solve a written problem (case-study). The trainer provides a problem-solving process and if lectures are provided they are minimal. (Keywords: group work, student-centered)
Training Strategy: Other	Proceduralized Instruction	Trainer provides trainee either step-by-step instruction of how to perform a task and/or instructions on the conceptual knowledge needed to learn a task. Trainees are provided with direct guidance. (Keywords: direct instructional guidance, procedural information)
Training Strategy: Other	Team Training	Training teams as a whole, instead as individuals. Training is designed such that trainees acquire new information, skills, and interpersonal skills as a group with the goal of improving the team's performance. (Keywords: cooperative learning, collaborative training)

Category	Attribute Name	Attribute Definition
Task Category	Cognitive-Complex Decision Making	Situation assessment and decision making skills in complex, dynamic and time-sensitive environments with changing situations, attentional demands, application of strategies and multiple goals. It may involve coordination of perceptual and motor skills.
Task Category	Cognitive-Declarative	This category includes all verbal knowledge categories including facts, principles, knowledge organization, and verbal or graphical mental models.
Task Category	Cognitive-Problem Solving	Application of principles, rules and concepts to process information and solve problems. Includes general logical reasoning skills; inductive, deductive, and diagnostic.
Task Category	Cognitive-Procedural	Performance of basic procedural skills, where the procedure may include cognitive steps and basic perceptual and motor steps such as those involved in navigating a computer interface.
Task Category	Cognitive-Quantitative Reasoning	Application of mathematical concepts and skills to solve problems.
Task Category	Cognitive-Spatial Reasoning	Visual-spatial skills involved in determining spatial relationships with respects to own body orientation and with representing, transforming, generating, and recalling symbolic, nonlinguistic information. (Keywords: spatial perception, spatial visualization, and mental rotation.)
Task Category	Interpersonal	Social interaction skills, including but not limited to verbal and nonverbal communication, persuasion, building and maintaining relationships, and managing conflict.

Category	Attribute Name	Attribute Definition
Task Category	Perceptual	Skills involved in detecting and interpreting sensory information in order to gain awareness and support performance. The ability to detect and use sensory cues. Include some perceptual reasoning tasks.
Task Category	Psychomotor	Physical skills - movement, coordination, manipulation, dexterity, strength, and speed – includes both fine motor skills and gross motor skills.
Task Type: Military Specific	Adaptability	The ability to respond effectively to a new situation and, specifically, to unpredicted changes; involves cognitive skills (intuition and critical thinking) and relational skills (self-awareness and self regulation).
Task Type: Military Specific	Battlespace Awareness	Knowledge and understanding of the operational area's environment, factors, and conditions, to include the status of friendly and adversary forces, neutrals and noncombatants, weather and terrain, that enables timely, relevant, comprehensive, and accurate assessments, in order to successfully apply combat power, protect the force, and/or complete the mission.
Task Type: Military Specific	Command and Control	The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission. Also called C2.

Category	Attribute Name	Attribute Definition
Task Type: Military Specific	Critical Thinking	Involves interpreting, reasoning, assessing, and monitoring. The ability to analyze a battle situation, recognize its decisive elements, and devise a workable solution.
Task Type: Military Specific	Digital Skills	Using military computer software, typically digital command and control systems, to accomplish missions on the battlefield. These skills include: the procedural steps of navigating menu systems, creating reports, plans, overlaps, reading maps, communicating and collaborating with other groups involved in the mission, managing a high volume of incoming data and using this data to visualize the battlefield and maintain high levels of situation awareness. (Examples: ABCS, FBCB2, MCS, ASAS, AFATDS, CPOF, and GSS)
Task Type: Military Specific	Intelligence Gathering	Collection of intelligence on other units or forces by own units or forces. Intelligence is the product resulting from the collection, processing, integration, analysis, evaluation, and interpretation of available information concerning an adversary, foreign countries or areas.
Task Type: Interpersonal Skills	Active Listening	Listening attentively, responsively, and nonjudgmentally in a two-way exchange for the purpose of meaning-making and understanding; that is, paying attention to both what is being say as well as what is being done and responding or reciprocating appropriately to questions, ambiguities, and nonverbal cues.

Category	Attribute Name	Attribute Definition
Task Type: Interpersonal Skills	Assertive Communication	The ability, willingness, and readiness to appropriately and succinctly express emotions, preferences, opinions, concerns, or needs positively, directly, and with self-confidence without being offensive or hostile during the social interaction towards another person.
Task Type: Interpersonal Skills	Conflict Resolution	The process in which interpersonal communication is used to allow two conflicted parties to reach an amicable and satisfactory point of agreement.
Task Type: Interpersonal Skills	Cultural Awareness	Cultural awareness is having the cultural knowledge and cultural skills to effectively interact with individuals from a different cultural background and to be able to choose appropriate courses of actions, especially with regards to negotiation. Cultural knowledge includes knowledge of thoughts, feelings and attitudes of oneself, and others within the cultural situation. Cultural skills include the verbal and nonverbal communication skills.
Task Type: Interpersonal Skills	Leadership Skills	The ability to influence people by providing purpose, direction and motivation while operating to accomplish a shared objective in a positive work environment.
Task Type: Interpersonal Skills	Negotiation	A process in which a dispute is resolved or a compromise is reached through the use of discussion and/or bargaining. Both sides in the dispute attempt to come to terms, build understanding, achieve consensus, reach agreement, form contracts and resolve conflict.

Category	Attribute Name	Attribute Definition
Task Type: Interpersonal Skills	Nonverbal Communication	The encoding and decoding of body language, postures, gestures, facial expressions, proximity, and other nonverbal behaviors/signals to enhance, reinforce, modify, or replace the verbal messages of an interpersonal communication.
Task Type: Interpersonal Skills	Relationship Building	The ability to develop and foster positive bonds with others.
Task Type: Miscellaneous	Academic Knowledge	A college or high school course teaching a non science, mathematics, or computer programming topic. Examples include: psychology, architecture, second language, and accounting.
Task Type: Miscellaneous	Aviation Domain	A wide range of knowledge and skills required to fly non-military and/or military aircraft. Examples include: flight maneuvers, in-flight procedures, time-sharing, HUD display interpretation, SAM detection and pilot characteristics.
Task Type: Miscellaneous	Collaboration	An active data sharing process for both parties involved, not passive. Examples include: interagency communication during crisis, pilot/co-pilot communication, and BiLAT negotiations.
Task Type: Miscellaneous	Computer Skills (non-military)	Using non-military computer software, in a business or academic setting. Typically the tasks are procedural in nature. Examples include: word processing, computer-aided drawing program, and web-based literature search tools.

Category	Attribute Name	Attribute Definition
Task Type: Miscellaneous	Equipment Diagnostics & Maintenance	Tasks and skills needed to keep mechanical or electronic systems in good working order. If a system breaks, then having the ability to locate and correct faults in mechanical or electronic system. Examples include: automotive maintenance, equipment troubleshooting and fault diagnosis of complex systems.
Task Type: Miscellaneous	Equipment Usage	The use of job specific mechanical or electronic equipment. Examples include: rifle marksmanship and procedures, using a digital watch, using a voltmeter and using medical equipment.
Task Type: Miscellaneous	Laboratory Task	A task that does not directly translate to a real-world task domain and which is conducted in a laboratory setting. These tasks are generally used to measure training with respects to specific task categories, for example cognitive-complex or psychomotor. Examples include: lever-positioning, stimulus-response pairing, rules from examples and serial motor task.
Task Type: Miscellaneous	Managerial	Making business decisions and lead subordinates within a company. Managerial skills include interpersonal skills (relationship building, negotiation), technical skills (knowledge of trade), and conceptual skills (idea development and strategy implementation). Examples include: delegating authority, implementing executive decisions and labor relations.

Category	Attribute Name	Attribute Definition
Task Type: Miscellaneous	Medical Domain	A wide range of knowledge and skills required to operate within in the various branches of the medical industry. Examples include: medical diagnosis and treatment procedures, nursing, surgery and medical related college courses.
Task Type: Miscellaneous	Science, Math or Programming Skills	A college or high school course teaching subject matter that requires quantitative and logical reasoning skills; including all branches of science, mathematics and computer programming. Examples include: chemistry, geometry, accounting and artificial intelligence design.
Task Type: Miscellaneous	Situation Assessment	The evaluation, interpretation and awareness of data gathered from one or more sources. Examples include: simulated radar tracking and decision making task, air traffic control, unmanned vehicle asset allocation and operation, and using digital command and control systems to identify and communicate potential threats.
Task Type: Miscellaneous	Sports	An activity involving physical exertion and skill in which an individual or team competes against another or others.
Task Type: Miscellaneous	Target Identification	Classifying a target based on the examination of its characteristics. For example: identifying friend and foe spacecraft in the software Space Fortress, discriminating between surface-to-air missiles, Anti-Air Warfare Coordinator (AAWC) tasks and air traffic controller tasks.

Category	Attribute Name	Attribute Definition
Task Type: Miscellaneous	Tracking	Viewing and keeping a moving target in sight. Examples include: target tracking, using a radar tracking system and compensatory tracking.
Task Type: Miscellaneous	Vehicle Control	Tasks involved in navigating, guiding and maneuvering an air, ground or water vehicle. Examples include: flight control, submarine navigation, driving a car and operating an unmanned aerial vehicle.
Individual Factors	Ability	The report presents a relationship between training effectiveness and some measured aspect of the trainee's task-related ability, skill or aptitude. Examples include: ASVAB, verbal comprehension, numerical reasoning ability and mechanical ability.
Individual Factors	Age	The report presents a relationship between training effectiveness and some measured aspect of the trainee's age.
Individual Factors	Education Level	The report presents a relationship between training effectiveness and some measured aspect of the trainee's level of education. Examples include: undergraduate, masters, and high school diploma.
Individual Factors	Experience	The report presents a relationship between training effectiveness and some measured aspect of the trainee's familiarity with the task content. For example: prior knowledge of task and military experience.
Individual Factors	Motivation	The report presents a relationship between training effectiveness and some measured aspect of the trainee's incentive to learn or be trained.

Category	Attribute Name	Attribute Definition
Outcome Measure	Learner Reaction	The report presents a measure of trainee affect or perceptions before, during, or after training administration.
Outcome Measure	Learning	The report presents a measure of target task or skill performance evaluated in terms of either the rate of learning the target task during training, a declarative or conceptual knowledge test, or a test in which an actual task is performed and evaluated that utilizes the skills trained.
Outcome Measure	Retention	The report presents a measure of target task performance following a period of time after training administration to assess degradation of performance.
Outcome Measure	Transfer	The report presents a measure of what was learned in training in a test with a task or problem somewhat different, but similar to that used in training.
Outcome Measure	Transfer-Job	The report presents a measure of performance of the trained task/skill in a work environment.
Meta-analysis	Training Difficulty	Report results are included in training difficulty meta-analysis.
Sample	Academic	Study sample is undergraduate or high school students.
Sample	Military	Study sample is military personnel.
Sample	Work	Study sample is people in the workforce.
Delivery Method	Classroom	
Delivery Method	Comparing Delivery Methods	This document compares different delivery methods.

Category	Attribute Name	Attribute Definition
Delivery Method	Computer-based	The primary delivery environment is a computer-based presentation of the training material. The computer-based training environment can be online (web-based), on a local network, or on a single computer. The training methods are implemented within the computer-based environment. Includes CAI, CBT, and many ITS systems.
Delivery Method	Field/Real System	The primary delivery environment is a field exercise with real equipment or training using the actual operational system or device. This includes training to use computer applications, sports, real science labs etc.
Delivery Method	Gaming	Interactive simulation with competition & scoring as well as constraints, privileges and penalties.
Delivery Method	Simulation-based	The primary delivery environment is an interactive synthetic environment that approximates the real world environment or equipment in which the target task is to be performed. It can include desktop system simulations, equipment simulators, virtual environments, and networked environments. It also includes simulation gaming environments. A key difference from computer-based is that the trainee manipulates variables in the environment to change system states and outcomes.
Delivery Method	Web-based	Instruction which is delivered via a computer using the Internet, enabling instant updating, distribution, and sharing of information. Gives learners the ability to communicate interactively with others online and access to other information and media via the web.